AIR Pictorial and AIR RESERVE GAZETTE

APRIL, 1956

The INTERNATIONAL AVIATION ENTHUSIASTS' Monthly

1/6

Vol. XVIII No. 4

There is excitement, exhilaration, in the lift and thrust of jet flying. There is also a deep and lasting satisfaction, known only to those who fly. Ask these men to describe it and words fail. Ask them to do without it and they worry. Once you have shared the tranquillity of that new world above the clouds, you cannot easily forgo it.

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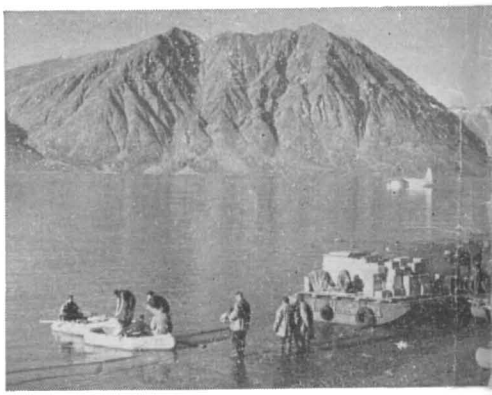

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Editor:
FRANK HILLIER

AIR Pictorial and AIR RESERVE GAZETTE

Proprietors:
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LONDONDERRY HOUSE, 19 PARK LANE, LONDON, W.1.

Editorial Offices:
19 PARK LANE, LONDON, W.1
Telephone:
GROsvenor 1530 and 1382

Advertisement Manager:
Derek Merson
2 BREAMS BUILDINGS
LONDON, E.C.4
Telephone: HOLborn 5708

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Policy for Defence

NO ONE will envy the task of any British Government in evolving a policy for defence. With our allies we are in the unenviable position of being on the defensive. We have no intention of attacking any other country. The potential aggressor therefore holds all the cards and very much of the initiative.

From this it results that there are at least three kinds of war for which we must prepare. The nuclear war we firmly believe will not happen—so long as we are in a position to return blow for blow. Therefore we must spend the vast sums entailed to play our part in nuclear war. Then there is the conventional war in which the Soviet aggressor would enjoy the benefit of the possession of a huge horde army against which we could offer no more than delaying resistance. He could mount a formidable submarine offensive against our sea communications, and he could deploy formidable conventional bombing forces against this country. To this could be added devastating attacks by ballistic or guided missiles not fitted with atomic or nuclear warheads.

Thirdly, he can embark on a campaign of attrition through repeated provocation of small wars, causing us to spend our substance in futile but necessary operations, ranging from those on the scale of Korea to such episodes as the Malayan and Mau Mau rebellions. And during the whole of these processes he can, as he is doing, maintain the pressure and the tension of a cold war.

He can do all these things because of his immense natural resources, because his totalitarian regime makes it possible for him to mobilise these resources, including human resources, to the building up of a huge industrial and war potential, because he is able to employ millions of slave labourers in concentration camps. It is possible to imagine that only a country of the size of the U.S.S.R. or of the United States can undertake armaments to cover all eventualities on an adequate scale, especially in view of the fantastic cost which conventional weapons have attained and which is being exceeded by those which will form the next generation of both sea and air weapons. The difficulties which thus arise are forbidding.

To take one example: when we first decided that we must have a force of jet atom bombers, three types were put into production, following the analogy of the Manchester/Lancaster - Stirling - Halifax precedent, and this was generally approved for the reason that with these large modern aircraft it was never possible to tell which of three designs of similar specification might prove the most successful. The principle is still sound in itself. But we have only one P.1 type project, and we have one supersonic bomber project. If in either case the story of the Hunter or the Swift should be repeated, where shall we be? Yet, on the other hand, have we the financial resources to undertake several projects in the new fields of fighters and bombers?

These are painful questions. There must be limits to what we can attempt in the way of guided missiles and of other weapons.

While these are some of the difficulties that face any British Government, we are far from believing—and we have said this before in these columns—that the country has been well served in defence matters by successive governments since the war. There have been late starts in every department of defence thinking and of defence production. It is almost impossible to imagine that really worthwhile progress can have been made when there have been five Ministers of Defence even since the present Government took over. This is not the right approach to defence. The country has undoubtedly been disturbed by the revelations in recent Estimates debates of the unsatisfactory state of our defences, and particularly of our air defences, and it is time that more concentrated and consistent thought were devoted at the very highest levels to the immense—and terrifying—problems which face us in relation to our future security.

THIS MONTH'S COVER

ALTHOUGH the English Electric **P.1** (P for Pursuit) was first flown by W/C Roland Beamont at Warton, Lancashire, on 4th August 1954, air-to-air photographs (including this one) have been restricted for the past eighteen months. Five prototypes and twenty pre-production P.1As are on order. Power is two 8,000-lb. s.t. Armstrong-Siddeley Sapphire axials. All other data is restricted. WG760 is the first prototype.

Problems of Defence 1956

By AIR MARSHAL SIR ROBERT SAUNDBY
K.C.B., K.B.E., M.C., D.F.C., A.F.C.

AN irritating thing about White Papers and Government publications in general is their habit of calling a spade a "manual implement employed in the simpler processes of agriculture". In last year's White Paper, "Statement on Defence, 1955", the blazing heat of an H-bomb was described as "thermal radiation". I realise, of course, the advantages, when trying to forecast future events, of using language in the tradition of the Delphic Oracle—in which all meaning is smothered by excessive verbiage or so phrased as to be deliberately ambiguous—but it has the disadvantage that those who read are neither as shocked or as inspired as they should be.

It is therefore pleasant to read in the "Statement on Defence, 1956" (Cmd. 9691) presented to Parliament last month by the Minister of Defence, an unusually clear exposition of the problems facing us.

The White Paper begins by re-affirming the broad statement of policy in last year's White Paper, which defined our task as a three-fold one. First, we must do our best to prevent a world war by developing our air power and our stock of nuclear and thermo-nuclear weapons. Secondly, we must play our part in the defence of the free world, and particularly of our Commonwealth and Empire. And thirdly, we must meet our peace-time commitments overseas arising from our position as a great Power with world-wide responsibilities.

The Minister of Defence goes on to give an up-to-date assessment of the main factors—political, strategic, and economic—that affect our policy.

No Change in Soviet Policy

Under the heading of political factors, the White Paper says that the genuine hopes of relaxation in international tensions, aroused by events last summer, have not been fulfilled. There is, it says, no change in the Soviet long-term policy, which aims at world domination, and "The Communist Powers still seek by all means in their power to undermine the collective defences of the free democracies". The aim of the democracies is to establish a framework of peace and prosperity within which the peoples of the world can develop their lives in freedom, and our military forces must be designed to support this aim.

The Soviet Government uses its policy of co-existence as a "façade behind which new offensives against the democracies can be planned at leisure and launched at will", and it is essential that the democracies should "maintain their strength and deploy it in such a way that those offensives are not worth launching or are checked at an early stage". While we must always be ready to negotiate, negotiation "cannot succeed unless it is clear that the democracies have the will and the means to maintain their integrity".

From the strategic point of view, it is reaffirmed that the increased power of the deterrent, that is, nuclear weapons and the means of delivering them, has made global war more frightening and less likely. Included in the deterrent are an effective early-warning system and the ability of the N.A.T.O. forces to hold the line by land, sea and air until the nuclear counter-offensive has broken the back of the enemy assault.

"Never the Aggressors"

The White Paper deals with the argument that the build-up of air power and a stock of thermo-nuclear weapons by the Russians will reduce the value of our main deterrent. It is firmly stated that this will not be so, because the objective of the Western Powers is defensive. "They will never be the aggressors, but they must have, and be known to have, the power of instant and overwhelming retaliation if attacked. It is the retaliatory power which is the vital factor."

In addition to preventing global war, we have to be prepared for the continuance of the cold war, and for the outbreak of localised wars, in which "the possible use of nuclear weapons cannot be excluded". If global war were to break out, it would be a struggle for survival of the grimmest kind. Its course would be unpredictable after the "initial intense phase"—presumably an exchange of thermo-nuclear weapons—and we must put the emphasis on forces which are "flexible, mobile, well-trained, well-equipped and versatile. They must be ready for immediate action; we can no longer rely on meeting our needs for men and munitions by mobilizing reserves of untrained manpower or of industrial capacity".

In the field of home defence, "the emphasis must be on planning and research and on measures to secure full co-ordination between the military and civil authorities".

Full weight is given in the White Paper to the economic factors which govern the size of the effort which we can afford to devote to our defence. It points out that the "continued economic strength of the free world is an essential element in our ability to resist Soviet aggression and the burden of defence cannot be allowed to rise to a level which would endanger our economic future". And this burden is not confined to the effect of high defence expenditure on our financial position, important though that is. Defence production makes great demands on the metal and metal-using industries, which supply about half our exports and thus play a vital part in strengthening our balance of payments. In addition, our forces overseas involve a heavy direct charge on the balance of payments.

It is, indeed, only too clear that a very high level of defence expenditure seriously adds to the present overstrain of our resources, and aggravates the inflationary situation which is causing the Government—if not the people—so much anxiety.

Reduction of Forces

The White Paper points out that the cost of new-type weapons is already very great, is increasing, and will go on increasing. Since there is a point beyond which, for economic reasons, our defence expenditure cannot be allowed to rise, we must aim at smaller and better-equipped forces, and the Government has decided that the manpower in the Forces must be reduced to about 700,000 by March 1958. As this figure was 823,630 on April 1st, 1955, this means a reduction of some 125,000 men, or nearly 15 per cent in three years.

The importance of scientific research and development is stressed, but it is pointed out that we cannot afford to spread our efforts too widely. Our research and development programme has become overloaded as a result of this tendency, and it has now been decided that if we are to keep abreast of developments in other countries we must concentrate on a limited number of projects of the highest strategic importance.

Although it is not practicable, at a time of rapid technical advances, to look too far ahead, the Government has planned its proposals with regard to probable developments over the next seven years. The White Paper admits that "the experience of the last few years has shown that these programmes should be framed over a period of at least three years and viewed against a still longer-term plan". This is a welcome advance over the short-term myopic outlook which used to characterise our defence thinking.

More for Research

The estimate for the Ministry of Supply, which includes the cost of research and development, is £185 million, an increase over last year of £37.5 million.

The White Paper also has something to say about disarmament, and a good deal to say about civil defence, but it is not possible to deal with these complicated subjects within the scope of this article.

There follows a summary of the programmes of the three Services in the light of the foregoing policy. Here, unfortunately, the clarity which marked the earlier paragraphs is lacking and any expectations that the Forces are to be drastically re-shaped to meet the challenge of the atomic age are not borne out.

The effective fleet at the disposal of the Royal Navy will be smaller than at present. It must therefore be of modern design and possess the most up-to-date equipment. In limited war we aim to have available for service in any part of the world a force of

aircraft carriers supplemented by cruisers and escorts. There is no follow-up of last year's suggestion that a carrier battle group equipped with bombers capable of carrying atomic bombs might be used to supplement our main air offensive.

The threat from submarines is admitted to be greater than ever before, and the Navy is "continuing to pay great attention to increasing the effectiveness of its anti-submarine forces by the building of anti-submarine ships and aircraft, and the development of anti-submarine helicopters".

The Reserve Fleet is to retain only ships capable of putting to sea at short notice and fighting effectively in a modern sea war.

The Navy, alone among the three Services, will have more money to spend than last year, as its Estimates are increased from £347 million to £351 million, though its strength is estimated to fall from 128,400 men to 122,500 next April.

Air Transport is Vital

The Army, though reduced in strength, must be capable not only of giving a good account of itself in global war, but must be able to adapt itself to the conditions of limited war. Trials are being carried out in Germany to determine the best organisation for nuclear war, and Lord Montgomery has already given his views as to the form which this re-organisation should take. (*R.U.S.I. Journal*, November 1955.) He laid great stress on air transport and air supply, but the White Paper has little to say about either, and no provision is made in the Estimates for any substantial increase in military air transport.

The cost of the Army will fall from £484 million to £479 million, and its manpower will drop from 437,000 men on April 1st, 1955, to 405,000 next April.

Last in seniority, but first in importance and cost, comes the Royal Air Force. It is responsible for providing our contribution to the nuclear deterrent, in the shape of "A" and "H" bombs and a bomber force capable of delivering them. The development of long-range ballistic missiles is proceeding, but the manned bomber is still relied upon as the means of delivering nuclear weapons, and it is promised that "technical improvements will be progressively introduced which will maintain the ability of the bomber force to strike home if the need should arise". The Valiant is now in service, and it will be followed during the coming year by the Vulcan. The Victor is not mentioned.

Missiles the Next Step

For some time to come the manned fighter will continue to provide the backbone of our air defence system, and the effectiveness of fighters will be greatly increased by equipping them with air-to-air guided missiles. Unfortunately, this is easier said than done.

Although a production order for the first of these weapons, the Fireflash, has now been placed, they are to be tested in a special mark of the Swift, which has completely failed as an air defence fighter, and is being produced in limited numbers in a fighter-reconnaissance version. It is now certain that the Hunter cannot carry the Fireflash without very serious modifications, which will take so long, according to the Minister of Supply (House of Commons, 29th February, 1956) that it will not be worth using in the R.A.F., but will in due course be offered for export. It will therefore be several years before we will have an air-to-air guided missile and a high-performance fighter capable of carrying it, as it appears that we shall have to wait until the English Electric P.1 comes into service.

It can now be realised how great a misfortune the failure of the Swift has been.

Resources are being made available for the development and deployment of ground-to-air guided missiles, but there is no indication that any of these weapons are being produced.

Good progress is said to have been made with the installation of new equipment in the Control and Reporting System, and in linking our system with the continental network. The performance of the latest radar equipment is said to be very satisfactory.

The new Mark III Shackleton with tricycle undercarriage and more powerful engines is about to come into service in Coastal Command. The Shackleton has proved very suitable for Coastal Command work, and can also be employed for other tasks, such as transport work.

Transport Command will be strengthened by the arrival of the Comet II, and a small number of Britannias have been ordered. On the other hand, the Beverley heavy freighter has been delayed by development troubles, but it is reported that these are being overcome.

In the 2nd T.A.F., in addition to the fighter reconnaissance Swift, the Canberra night interdictor is expected to reach the squadrons during the coming year. The F-86E Sabres in the tactical fighter squadrons have been largely replaced by Hunters, paid for by the American Government.

Air Estimates Down

The Air Estimates at £517.5 million are down by nearly £23 million on the figure for 1955–56, but it should be remembered that actual expenditure on the Air Force in the current year fell short of the estimates by some £40 million. The reason for this is given as loss of production owing to strikes, and the fact that development of new types of aircraft and equipment took longer than was expected. In addition, substantial orders for the Swift were cancelled, and the production programme for the Javelin was re-phased in order to get a better proportion of later marks. The provision for aircraft and equipment production for 1956–57 has been carefully examined in the light of the very disappointing experiences of the last few years, and is presumably expected to be a more realistic figure.

It is certainly to be hoped that production of service aircraft has been put on a sounder footing. Unprecedented delays and failures have forced the Government to re-phase production programmes in order to avoid accepting large numbers of aircraft nearing obsolescence. Such re-phasing in itself causes further delays, and the usefulness of our replacement types is most seriously reduced. Unless a marked improvement is shown during the coming year, the situation will be little short of desperate.

The manpower of the Air Force is expected to fall from 258,200 men on 1st April 1955, to 244,500 by next April.

Problem of Manpower

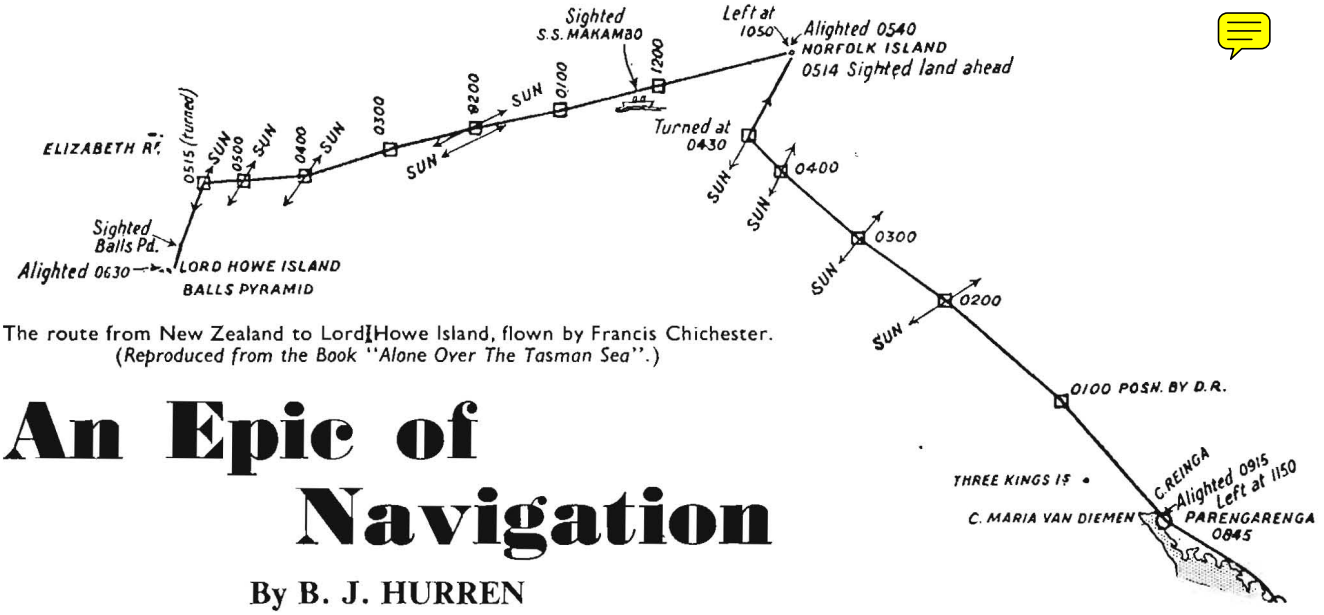
It is alarming to find how seriously the number of long-service Regulars in the three Services has fallen. The figure for April 1955 was 518,119, and for next April is expected to be 465,000. The same tendency can be seen in the figures for Regular recruiting. This was 81,000 in 1953–54, 72,700 in 1954–55, and 62,500 (estimated) in 1955–56. It is clear that the increases in Service pay announced recently have not come a moment too soon, and it must be remembered that pay alone is not sufficient. Bad accommodation, long periods of foreign service, difficulties over the education of children, and ungenerous treatment of Service pensioners—which the Government's latest proposals have done little to remedy—all contribute to this deplorable situation.

The principal fault in the White Paper is that, like its predecessors, it makes an excellent diagnosis of the situation and lays down admirable principles, but indicates that disappointingly little, at least in the coming year, will be done to translate those principles into action. The influence of Service tradition, military conservatism, and powerful vested interests combine to keep things going in the same old way in a rapidly changing situation. Perhaps the most serious omission—the one we shall live to regret most—is the failure to realise the need for military air transport. There can be no doubt that a sound and comprehensive system of military air transport, similar to the American M.A.T.S., will be an absolute necessity in the future, and we should long ago have taken energetic steps to create such a system.

Information Withheld

A further cause of dissatisfaction is the tendency to withhold the facts from the public, under a smoke-screen of vague promises and woolly generalisations. In America, things are very different, and the public is given much detailed information about the progress of their defence weapons. I do not, of course, suggest that we should give away information of value to an enemy, but there is no doubt that we could go much further without doing that.

When information is withheld about the progress made in building up our bomber forces and our air defence system, neither of which would be effective in deterring the enemy unless he was aware of their power and efficiency, the public can scarcely be blamed if it suspects that secrecy is being maintained in order to conceal the lack of progress.



The route from New Zealand to Lord Howe Island, flown by Francis Chichester.
(Reproduced from the Book "Alone Over The Tasman Sea".)

An Epic of Navigation

By B. J. HURREN

SETTING aside the usual significance of April Fool's Day, and the special significance that on 1st April 1918 the Royal Air Force came into being on the "marriage" of the Royal Flying Corps and the Royal Naval Air Service, there is one event of particular interest to the flying world—an event which is a classic in the annals of navigation—that took place on this day.

This year is the Silver Jubilee anniversary of the famous flight made by Francis Chichester across the Tasman Sea, from New Zealand to Australia. It was entirely a one-man show, undertaken against professional advice by a young man who only a few months before had not even taken his elementary flying lessons.

Let us first look at the machine, which was a de Havilland Moth with a Gipsy I engine, and the problem—a total journey, mainland to mainland, of 1,450 miles. With three petrol tanks the maximum range of the Moth was 1,270 miles non-stop, and there was a faint chance of cramming in further tankage to give as an absolute figure 1,430 miles. Therefore, the wild dream of a non-stop flight was out.

Closer scrutiny of the charts (and a profound faith in the hydrographer's arts) showed the way to a possible solution in that there were two pin-point islands roughly along the route. Norfolk Island was 481 miles from the northernmost point of New Zealand, and Lord Howe Island a further 561 miles, leaving a final leg of 480 miles to Sydney, New South Wales. Each stage was well within fuel capacity provided the two minute islands could be found in the great tracts of the ocean.

As it was extremely unlikely that either of these remote islands had any sort of landing strip, Chichester took the then bold step of converting the landplane to floats; and, incidentally, had to learn to fly seaplane-fashion.

Just to get the matter in perspective, Norfolk Island was a squat rock about 4½ miles at its widest, no more than the size of a sheep farm, with 300-ft. cliffs. Lord Howe Island was only 5 miles square, but it had near it a freak rock named Ball's Pyramid which rose like a jagged tooth out of the sea to a height of 1,810 ft.

The idea of finding these pin-points by an ordinary dead reckoning with a magnetic compass was quite impracticable; half-a-degree error would have meant disaster. Undaunted, Chichester began to learn astral navigation. As the problem was studied more deeply, he decided on a system of hourly position-lines.

Now here came the stroke of pure genius. What Chichester did was to devise what may be termed the Theory of the Calculated Mistake. In this, for the first leg of the trip, he set course for an imaginary point 90 miles to port of the target island. By sextant observations of the sun, he could tell for certain when he had reached a line between the island and the imaginary point, but could not tell whereabouts on the line he was. However, by turning to starboard at right angles (more or less) along the line, he then knew he must be travelling towards the island, and as he already knew the island was on the line he must hit it off.

Along the route from New Zealand he took regular sun altitude sights, a feat of juggling which can hardly be imagined in an unencumbered Moth, let alone the cluttered-up version he was flying. To make matters worse, the altimeter failed and he had to guess his height over the sea. As if this were not enough, rain squalls and heavy cloud frequently obscured the sun.

Over the featureless water Chichester flew to plan, and in the early evening came the vital time to turn to starboard. "A simple decision", he later recorded, "but I lived a generation in each minute" after that turn when the island did not show up. It was in fact for seven agonising minutes that he held course, striving to quell panic before land loomed ahead and he could shortly afterwards make a safe landing.

These successful navigation tactics, which had not been exploited before, were repeated for the second leg to Lord Howe Island, this time heading for an imaginary point 109 miles N.N.E. so that a turn to port would then be required.

After flying for 6 hours 10 minutes he was in acute doubt as to whether he had covered 491 miles as derived from sextant observation, or 464, obtained by dead reckoning based on the strut speed-indicator reading. To increase the hazards of this nightmare flight, the propeller was vibrating badly, and gave the impression that the whole machine might at any moment disintegrate.

Dark, rain-sodden clouds, an angry sea—and no sign of the sun! There was also a 40-mile-an-hour wind. "At last I gave up all hope", but immediately afterward she spotted a ray of sunshine piercing the clouds, and was able to get the necessary sextant sight. Heavy nimbus frequently deceived his eyes as being land, but eventually, in the murk after 6 hours 53 minutes from start, land lay directly ahead . . . a veritable moment of triumph.

In fact, this was Ball's Pyramid, the solitary rock 12 miles beyond Lord Howe Island . . . and the island itself had been obscured by low cloud. If he had missed this solitary sentinel he was set for the open sea and oblivion.

Chichester's own account is recommended reading: it has a nostalgia of its own, and though in the passing years his style has much matured, the freshness of his writing comes like magic from the past. It is a "must" for any reputable aviation library to have *Alone Over the Tasman Sea*; it compares well with such favourite escape reading as Oliver Stewart's *The Clouds Remember*, which is possibly the highest compliment of all.

close of the year by a sheriff's sale. Z. D. Granville thereupon became an aeronautical consultant in conjunction with several of his acquaintances, among them being Alfred D. Chandler and William B. Hurlburt.

The last of the line was the Q.E.D. R-6H two-seater built by Granville, Miller and de Lackner, the original firm's successors, and derived from the single-seat Super Sportster R-5 and the three-seat Super Sportster International Courier projects.

Welded steel tubing formed the fuselage, which was metal-cowled forward and fabric-covered aft of the main spar. Plywood with a final fabric exterior covered the wooden wings and tail. The wing span was 33 ft. 3 in., length 27.16 ft., height 9 ft. 6 in., wing area 211.55 sq. ft., weight empty 3,812 lb., and loaded 7,000 lb.

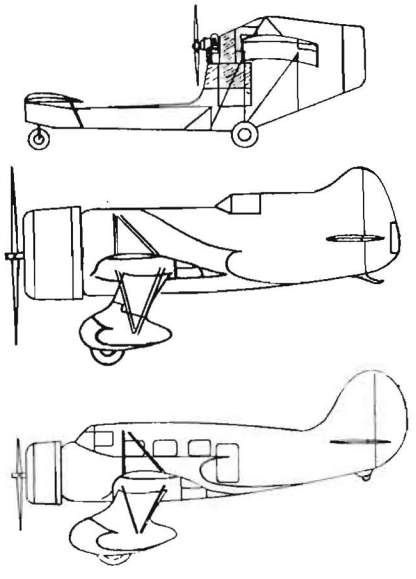
The forthcoming MacRobertson England to Australia Race gave Zantford Granville the opportunity to design the three machines before he was killed when his Sportster spun into the ground from 70 ft. in North Carolina in February 1934.

Only the Q.E.D., NX14307, was built. It was fitted with the 700-h.p. P. & W. Hornet S5E engine, turning a Hamilton-Standard controllable-pitch airscrew to give a top speed of 240 m.p.h. The machine cruised at 200 m.p.h., landed with flaps down at 69 m.p.h. and with flaps up at 90 m.p.h., and climbed at 2,050 ft. per minute.

NX14307 flew in dark green racing colours as No. 77 in the September 1934 Bendix Race with Lee Gehlbach, but was the last to finish, arriving in third place to be disqualified for late arrival. In the October 1934 MacRobertson Race it was entered by Clyde Pangbourne as No. 46, the pilots being Jacqueline Cochran and Wesley Smith. Bad luck overtook them at Bucharest, and they retired after a forced landing due to flap and engine failure.

Returning to the U.S.A., the Q.E.D. continued to race for several years, but still

Top to bottom: Gee-Bee Ascender, Super Sportster R-5, Eightster C-8.



The Model R-6H two-seater XB-AKM "Conquistador del Cielo". Engine was a 700-h.p. P. & W. Hornet S5E. (*Photo: Rudy Arnold.*)

without success. In each of the races entered, the machine was forced to retire. This happened in the 1935 Bendix Race (when Royal Leonard withdrew at Wichita with engine failure), in the 1936 Bendix with Lee Miles, and in the 1936 Thompson, in which it retired in the last lap. The Q.E.D. was then bought from Miss Cochran by Charles Babb and was overhauled and repainted by the Timm Aircraft Corporation. Entered in the 1938 Bendix Race, it was flown by George Armistead, who was forced to land in Arizona without completing the course. During this racing season the Q.E.D. had an all-white finish with red fuselage flash and markings, and black race number 61 on the fuselage and above port and below starboard wingtips.

In 1939 the Q.E.D. passed into the hands of the Mexican Government. Captain D. A. Francisco Sarabia, a noted Mexican pilot, flew the aircraft, registered as XB-AKM and named "Conquistador del Cielo", on an outstanding flight from Mexico City to New York, a distance of 2,350 miles, in 10 hours 47 minutes on 24th May 1939. The flight was made at 16,000 ft., and a fast downwind landing was made on arrival with one gallon of fuel left in the tanks! The Q.E.D.'s unlucky career was nearing its end, which came a few days later at 5.30 a.m. on 7th June.

Captain Sarabia took off from Bolling Field, Washington, D.C., to return to Mexico. The engine failed at about 100 ft. and the Q.E.D. crashed into the Potomac River, killing the pilot. Subsequent investigation showed that a rag left in the cowling had been sucked into the carburettor.

An interesting experimental type was the lightweight canard "Ascender". This had the tailplane on the nose with the rudder at the rear of the hatchet-shaped fuselage. A large vertical surface formed the cabin of the machine, to which the parallel-chord wings were wire-braced. The two-cylinder horizontally-opposed engine was mounted over the cabin in front of the leading edge of the wing. A tricycle undercarriage supported the "Ascender" on the ground. When tested by Mark Granville, the machine turned into a flat spin and fell to the ground, injuring the pilot's back.

Other aircraft projected but not built included the C-4 Fourster, the C-6 Sixster and the C-8 Eightster. The C-8 eight-seater was to have had a 700-h.p. Wright Cyclone R-1820-F, a span of 47 ft. 9 in., a length of 32 ft. 11 in., a loaded weight of 7,000 lb., 870 miles range, and a top speed of 225 m.p.h.

Details of the unbuilt three-seat Super Sportster International Courier included a wing area of 390 sq. ft., empty weight 3,685 lb., loaded 10,000 lb., top speed 230 m.p.h. and cruising speed of 200 m.p.h. The single-seat Super Sportster R-5 was to have had a P. & W. Hornet of 825 h.p., a span of 30 ft., wing area of 144 sq. ft., empty weight of 2,200 lb., loaded 5,040 lb., top speed 285 m.p.h., cruising speed 260 m.p.h., and a range of 1,850 miles.

A particularly outstanding feature of the company's work is the remarkable progress in design, achieved by such a virile and imaginative team in the four years which elapsed from the appearance of the original 1928 Model "E" Biplane to that of the world's landplane speed record-holding Super Sportster R-1 of 1932.

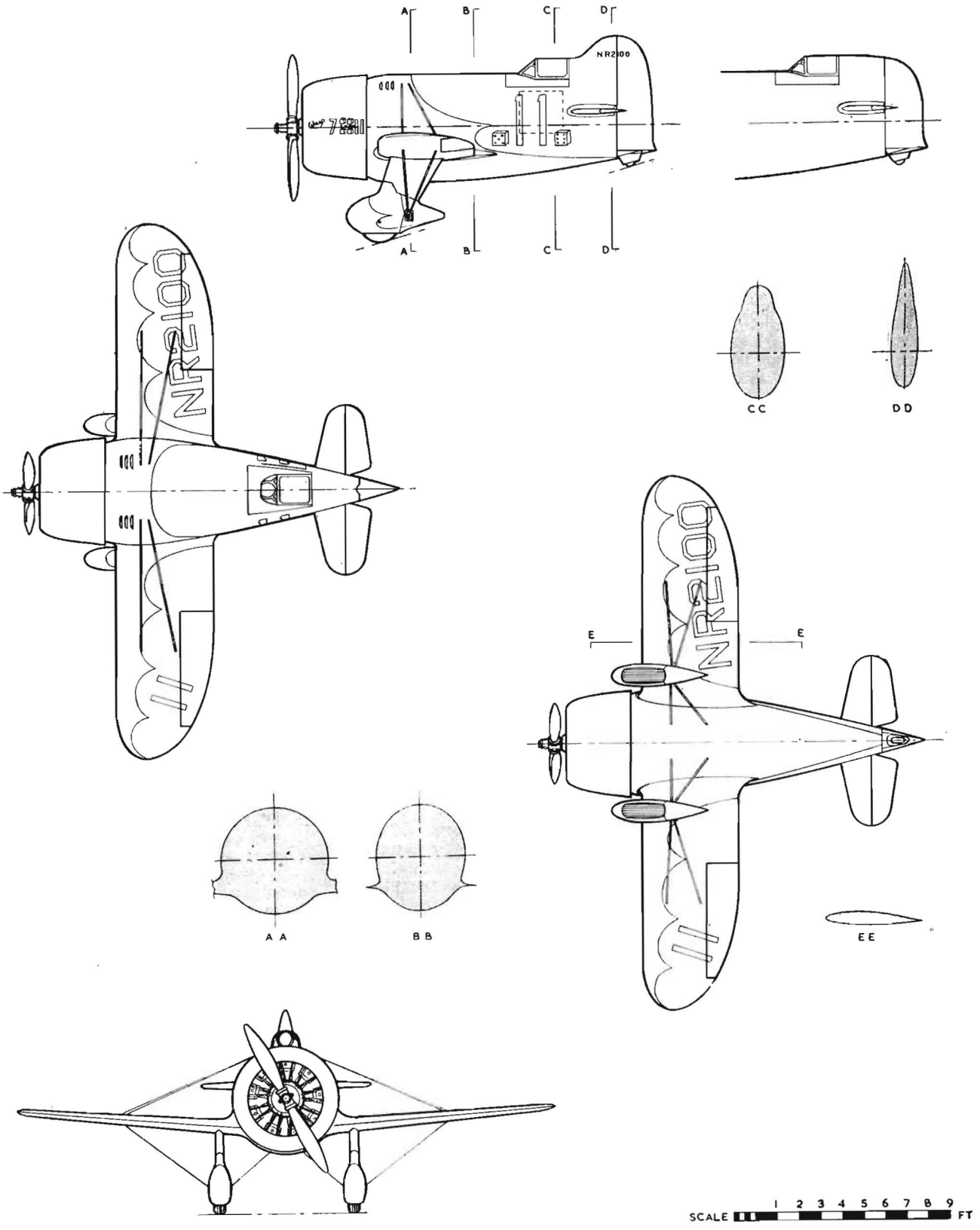
So ended the Gee-Bee generation—a brief but brilliant series of original racing and sporting designs which have left in their wake so many nostalgic memories by their performances in the heyday of competitive flying in the U.S.A.

SPECIFICATION OF THE GEE-BEE SUPER SPORTSTER R-1 NR2100 "11"

Span	25 ft.
Length	17 ft. 9 in.
Height	8 ft. 2 in.
Wing area	75 sq. ft.
Chord	4 ft. 5 in.
Track	6 ft. 4 in.
Dihedral	4½ degrees
Incidence	2½ degrees
Empty weight	1,840 lb.
Loaded weight	3,075 lb.

(For table see page 119)

1/72nd Scale Plan



N BLACKBURN.

Technical Notes

By "Boffin"

TEARING STRUCTURES

THE advent of the turbine airliner brought into juxtaposition two factors, high pressurisation and long life which together led to the tragedy of cabin fatigue. Much has been written about the metal fatigue aspect—the weakening of the cabin shell by repeated inflation to over 8 lb./sq. in.—and the absence, as yet, of any satisfactory theory for the initiating metallurgical phenomenon. It has to be accepted, therefore, that fatigue is an unavoidable evil which must appear at some time in the life of any structure. It follows that the best approach is to design a structure which will not fail catastrophically—that is to say it may crack but it will not tear.

Some interesting details of such design have recently been given in a lecture to the Institute of the Aeronautical Sciences by Mr. Arne Sorensen, Chief Structural Development Engineer of the Boeing Airplane Company.

Any material that is under a repeated, fluctuating load which is a third, or more, of the most that it can withstand will ultimately crack. The figure of one-third is, of course, a generalisation, but it is a fair average. The nearer the repeated load is to the breaking load of the material the sooner it will fail, and contrariwise the lower the load the longer the part will last. Engineers express this graphically as the Sn curve—stress against number of loadings—which looks like Fig. 1. The L-shape is characteristic, although the position of the "bend", as a percentage of the maximum strength varies widely with materials. It depends upon the elasticity of the material, that is the ability to resume the original condition and size after "stretching".

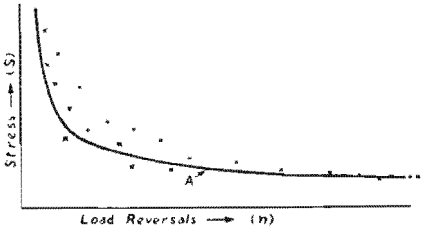


Fig. 1. A typical fatigue stress (Sn) curve. The "scatter" of test results shown by the dots is a feature of fatigue and is usually catered for by taking one-third of the average value.

It is obvious from Fig. 1 that, by designing structures so that the loads never exceed the stress levels in the flat base of the curve, the value A, they can be made infinitely safe—but become uneconomically heavy. Therefore the idea is to edge one's way as far *up* the curve as safety will permit. To do this it is necessary to differentiate between cracking and tearing.

Fatigue always manifests itself first as a breakdown of the molecular (or atomic, experts differ) bond of the material, that is a hairline crack. If this is seen in time it can be repaired, but once started it may extend rapidly until it reaches a critical point where it rips clean through the material. In the case of an aeroplane, the compressed air in the cabin and the external airflow will take hold of the tear and burst it open explosively.

The designer's aim then is to evolve a structure that will automatically limit cracks, so that tearing cannot occur. It is also important that these cracks should be easy to see, that is, they ought to be induced in the external skin rather than the internal framework.

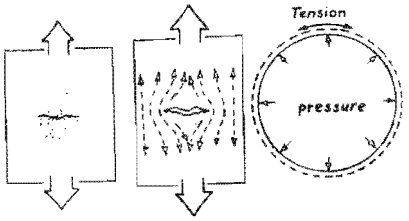


Fig. 2. A diagrammatic representation of the way the load develops as a cracked panel is pulled. The inset sketch shows how inflation of a pressure cabin causes tension in the cylindrical skin.

What happens is that when a crack starts, the load on a panel stretches it (Fig. 2) and the resistance of the metal to this pulling stores energy. The crack grows slowly, more and more energy is stored, until a critical crack length is reached at which it tears viciously—aided by the energy store. It is analogous to stretching a slightly torn elastic band, which flies apart on rupture with the energy stored in it by stretching.

(*Continued overleaf*)

(*Continued from page 117*)

GEE-BEE PROJECTS AND MODELS

Model	Year	Engine	Seats	No. built	Registration	Race No.	Span ft.	Span in.	Length ft.	Length in.
Biplane Model "E"	1928	Velie M-5	2	1	NR3086	—	29	0	20	7
Biplane Model "P"	1929	Kinner K-5	2	8	NC86W NC269V NC320V NC321V	— — — —	29	0	20	7
Sportster Model "B"	1930	Cirrus Ensign	1	Nil	—	—	25	0	—	
Sportster Model "C"	1930	Menasco B-4	1	Nil	—	—	25	0	—	
Sportster Model "F"	1930	Fairchild 6-390	1	Nil	—	—	25	0	—	
Sportster Model "X"	1930	Cirrus Ensign	1	2	NR49V	—	25	0	17	3
Sportster Model "D"	1930	Menasco C-4	1	2	NC11043 NC855Y	53 —	25	0	17	3
Sportster Model "E"	1930	Warner Scarab	1	4	NC11041 NC11044 NC856Y NC72V	— — — —	25	0	16	9
Senior Sportster "Y"	1930	P. & W. Wasp Lycoming	1/2	2	NR11049 718Y	54 —	30	0	21	0
Super Sportster "Z"	1931	P. & W. Wasp Junior	1	1	NR77V	4	23	6	15	1
Super Sportster R-1	1932	P. & W. Wasp Senior	1	1	NR2100	11	25	0	17	9
Super Sportster R-2	1932	P. & W. Wasp Junior	1	1	NR2101	7	25	0	17	9
Super Sportster R-1/R-2 Rebuilt	1934	P. & W. Hornet	1	1	NR2101	7	25	0	19	9
Q.E.D. R-6H	1934	P. & W. Hornet	2	1	NX14307	77/46/61	33	3	27.16	ft.

Technical Notes (*Continued*)

Tests showed that cracks can be stopped by close spacing of stiffeners parallel with the likely crack direction, i.e., longitudinally in fuselages and chordwise in wings. The stiffeners act like beams and prevent the skin from stretching and so opening the crack. Cracks also stop naturally when they reach the edge of the sheet, so that if the skin panels are narrower than the critical crack length, the tearing cannot occur.

Two other factors directly affect cracking, the skin material and, not unnaturally, its thickness.

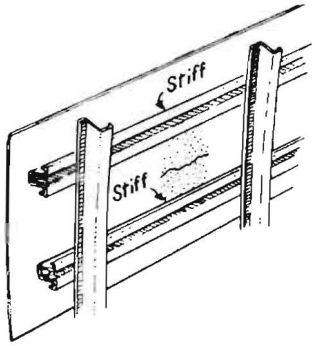


Fig. 3. Sketch indicating how the stiffeners support the skin round the crack area.

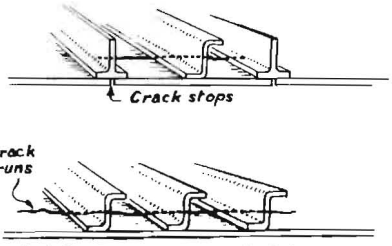


Fig. 4. A Boeing structure which limits crack development in the skin by the use of multiple panels.

It is also, of course, not sufficient just to stop tearing. When a crack occurs, no load is carried across the ruptured surfaces and, therefore, it has to be carried elsewhere—probably by the stiffeners themselves or the adjacent skin sheets. This is called designing a redundant, or "multi-load path", structure and is a requirement for modern airliners.

All this may sound somewhat abstract; what could be its effect in practice? The Boeing 707 suggests a couple of solutions. First, that vast pressure cabin—a particularly nasty structural problem.

Here, the principle of closely-spaced stiffeners is used to achieve tear resistance by preventing growth of cracks (or accidental damage) to the critical length and to provide multi-load paths. Those curious multiple windows are a manifestation of Mr. Sorensen's unique philosophy. Insertion of large, conventional windows means a break in structural continuity and requires weighty re-inforcements all round the openings, which are themselves potential sources of cracks. Instead, Boeing cuts out small sections between frames and stiffeners in the non-critical size skin panels. The edges of the openings then act as additional crack-stoppers for the intervening panels.

S.N.C.A. du Sud-Est Armagnac with two jet nacelles under the fuselage. Note the white anti-corrosion paint under the rear belly as a protection against the efflux combustion products.

Probably the longitudinal stiffeners above and below the windows are rather stronger, so that the brittle glass panels replacing the ductile light-alloy skin will not be dangerously tensioned.

It looks as if the wing skin-cracking problem—it has been prevalent in many post-war airliners—has been solved by using multiple spanwise, relatively narrow sheets. (Close-spaced chordwise stiffeners are scarcely suitable in a wing structure because of the nature of the flight loads.) This introduces a number of crack-stopping joints across the wing—but is a principle which is rather counter to recent ideas on reducing the number of parts to a minimum.

TRANSATLANTIC SILENCING

THE special silencing pen installed by Vickers-Armstrongs for ground running of the Swift was described in Technical Notes over a year ago. It will be recalled that it is a simple brick pen, into which the aeroplane is backed on three rails that locate its jet pipe in the entrance of a cylindrical metal "detuner". The latter is a large steel pipe containing concentric tubes of sound-absorbent material. The end of this jet muffler is turned upward to let the residual racket escape to the sky.

One of the difficulties when designing such a sound suppressor is the heat of the gases, 650 deg. C. or red heat, and their sonic velocity, which subject the materials of the muffler to a very severe hammering. It is always necessary to dilute the hot efflux with cold air induced by a venturi round the jet pipe. This induced air both cools and slows the jet. There is, too, a limit to the amount of obstruction permissible from the silencing "baffles", since undue back pressure affects engine performance.

A new ground muffler installed by the Republic Aviation Corporation for its Thunderstreaks and Thunderflashes is interesting. Unlike the British pens, no silencing of the intake end (that is the considerable compressor noise) has been attempted. The aeroplane is, however, positioned in a similar manner by being run backward on rails. The tail of the fuselage is enclosed in two tailored, semi-cylindrical doors which, when closed, leave an annular cooling-air space.

The gases and cooling air pass through a steel tube 20 ft. long and 5 ft. in diameter into a cylindrical "tank", also 20 ft. long but 10 ft. in diameter, finally emerging from a short, vertical stack. Republic does not divulge the contents of the cylinder, merely saying that it contains "a series of sound-absorbing chambers" instead of the usual splitter walls. This suggests that a new principle, the guiding of the gas past transverse walls, is involved.

The silencer is claimed to reduce the engine full-power noise by 75 per cent (23 decibels overall reduction), which merges into local traffic noises.

FRENCH FLYING TEST BED

THE French nationalised engine company SNECMA has recently started using a converted SNCA du Sud-Est Armagnac for testing its latest high-power turbojets. This aeroplane is now being flown in Armée de l'Air markings.

Two adaptable pods have been mounted under the wing/fuselage junctions. The mounting fairing is used for fuel lines and any other accessories. The pods are braced to wing and fuselage by several tubular struts. A periscope allows the engines to be viewed in flight for any signs of bad combustion. The Armagnac's vast cabin (13 ft wide and 65 ft. long) makes an unusually commodious flight test "office" with the comfort of pressurisation.

The new Republic jet muffler for F-84Fs.

FRANCE'S BID FOR VERTICAL MACH ONE 'PLUS'

French military aircraft designers are taking bold steps to evolve a new breed of single-seat interceptors with two targets in view: (1) vertical climb at Mach 1.0 to altitudes of 60,000 ft., and (2) "1,000 m.p.h. plus" or Mach 2.0 performance in level and sustained flight. *Air Pictorial* offers readers the first opportunity to examine two of France's newest entries in the race towards the Mach 2.0 interceptor fighter. The two radical designs are diametrically opposed in concept and shape—canard-delta *versus* straight wing, *Griffon v. Trident II.*

NORD-SFECMAS 1502 GRIFFON

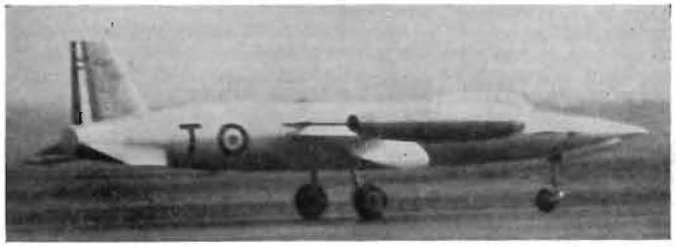
FIFTY-FOUR-YEAR-OLD Jean Galtier is one of the most advanced-thinking French engineer-designers of the present day. In his canard-delta Nord-SFECMAS 1502 Griffon is revealed the latest Galtier bold steps towards the Mach 2.0 high-altitude interceptor/fighter.

M. Galtier began his engineering apprenticeship in the mid-1920s when he joined the now defunct Bernard company. Successively he worked on the Bernard 12 C-1 single-seat fighter and the types 18 T and 19 T (also the 191 GR), the 60 T, 80 GR, 90 BR and 170 B. In 1937 he joined the Arsenal company and was associated with the late General Vernisse in the series of VG- fighters and fighter-bombers, starting with the VG-30 (post-war VB.10), the VG-33, -36, and -39. After the war, when the French aircraft industry got on its feet again, Galtier engineered the VG-70 and the VG-90—the former being his first swept-wing jet design. From the now orthodox, Galtier turned his attentions to the delta shape. The Griffon can be traced back through the 1402 Gerfaut (*Northern Falcon* or *Gerfalcon*) to the Arsenal Ars.1301 and Ars.2301 research gliders. Concurrently, the sole prototype SFECMAS 1402 Gerfaut was under construction at the old Arsenal factory of Lyon-Villeurbanne (Rhône). On 1st January 1953 Arsenal had been taken over by SNCA du Nord, and in due course the off-shoot SFECMAS, which controlled the Galtier projects, was taken over by Nord. This brought about a number of changes including the scrapping of the name Guépard (*Cheetah*) for the Nord-SFECMAS 1502 for the present one, namely Griffon.

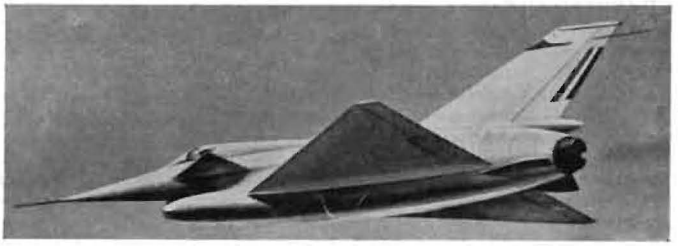
In its original smaller wing area and lower-powered form, the Nord-SFECMAS 1402 Gerfaut IA flew for the first time on 15th January 1954. Fitted with new wings of greater area to improve low-speed control, especially during landing and take-off, the Gerfaut (now the 1402B Gerfaut IB) passed through the "sound barrier" on 11th February 1955. As a concession to the NACA "area rule" the Gerfaut IB is now flying with a bulbous parachute-brake housing above the SNECMA Atar 101 jet orifice (see photograph). And, like the 1502 Griffon, the Gerfaut IB now has SNECMA re-heat with conical-section doors, as well as 120-degree ventral fins which also serve as tail bumpers.

Eight months later, on 20th September 1955, the 1502 Griffon was test-flown for the first time at Melun-Villaroche, and if the hump-backed Gerfaut delta research monoplane was eye-catching, the new Griffon interceptor has an even stronger claim for attention. Reference to the three-view silhouette reveals that the pilot sits behind a "nose cone" and well clear of the "straight-through" intake to the re-heat-boosted 9,240-lb. s.t. SNECMA Atar 101G-21 axial turbojet. The maximum speed is believed to be in excess of Mach 1.30 in level flight.

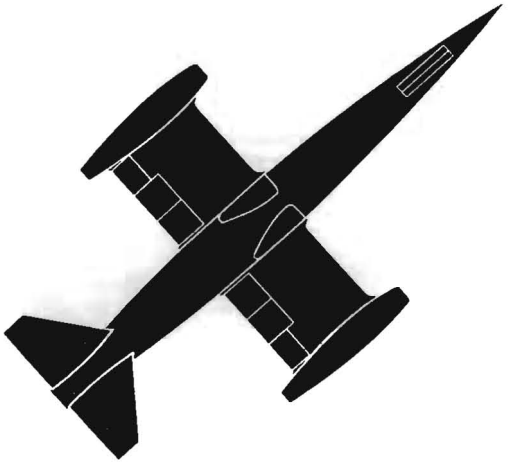
(*Continued on page 132*)



SO 9050 TRIDENT II



NORD 1502 GRIFFON



First photograph of an operational guided-weapon carrier, the McDonnell F-101A Voodoo, equipped with three Hughes GAR-1 Falcons and twin rocket packs.

The Journal of a Roving Spotter

SEVERAL interesting modifications were visible on the Wyvern S.4s which I saw at Yeovil recently, where production of the type is now complete but progressive overhaul and modification of those in service continues. The most obvious modification is a revised cockpit canopy, the rear of which is now metal instead of Perspex; the curved front of the windscreen has also been removed, leaving the flat bullet-proof panel in its original position.

A wing modification permits the substitution of wingtip tanks similar to those on the Venoms, and a new type of plastic tank can also be carried on the bomb shackle under the fuselage. Perforated air brakes are also now fitted under the wing centre section, each side of the fuselage.

The Wyverns I saw—for example VZ761—were sporting the latest-style markings, with "Royal Navy" in large letters each side of the fuselage and the serial number in small type beneath.

* * *

A fascinating collection of vintage aeroplanes was assembled at White Waltham when I was there last month. It warmed my heart to see, especially, the Swordfish which has been restored to flying trim by Faireys at Hamble and is now registered G-AJVH. We all hope to see this at flying meetings around the country this year.

Another wartime survivor at White Waltham was the Fulmar, G-AIBE, which the company now uses as a "hack". This was the first Fulmar built (N1854), now converted up to Mk. 2 standard with a Merlin 30F and fitted to carry pilot and two passengers. The Tipsy Junior G-AMVP (originally OO-ULA) was also present, as were the well-kept Reliant (G-AFVT) used for ferrying company personnel, and the Dragonfly G-ANZL in which Mr. Richard Fairey commutes to and from work.

There were, of course, plenty of Gannets to be seen, in various stages of development and test flying, in addition to the company's experimental helicopters—the Jet Gyrodyne XJ389 and the two Ultra-Lights, XJ924 and XJ930.

The two Ultra-Lights will, it now seems likely, be the only examples of the type built. News of the cancellation of Ministry sponsorship for the Ultra-Light was given by the Minister of Supply in the House of Commons on 29th February. Also cancelled, as he then announced, are the Hunting Percival P.74, the prototype of which (XK889) is nearly complete, and the Bristol 191 for the Navy.

Both the Fairey and the Hunting Percival types may, of course, continue to be developed by the companies as private ventures. Bristol will pursue development of the Type 192, the R.A.F. equivalent of the Type 191, and the Type 193, a Gazelle-engined variant.

Adoption of the Saro Skeeter by the Army, in lieu of the Fairey Ultra-Light, has produced two new designations—the Skeeter A.O.P. Mk. 10 and T.Mk. 11. These are equivalent to the Saro versions known as the Mks. 6A and 6B.

Westland continue to hold a strong position in the helicopter field, with the Whirlwind in steady production and new marks being developed. The Navy is now in the process of ordering from Westland the larger S.58 Wessex in the anti-submarine role, and the Eland-engined Westminster is also under development. I hear that the contract to produce a Whirlwind with a Blackburn Turboméca Twin Turmo shaft-drive turbine has been cancelled. The prototype, XJ445, was in an advanced state of construction.

* * *

An interesting fact revealed in the House of Commons debate on the Defence White Paper at the end of February was that whereas the Hunter was designed from the outset around Aden cannon, the Swift was designed to be our first operational fighter using guided weapons. This weapon, it is now known, was the Fairey Fireflash.

As the Swift has been dropped as an operational fighter, the introduction of an air-to-air guided weapon in R.A.F. service has been delayed, but reference was made in the debate to a new mark of Swift "to be used for gaining experience with air-to-air weapons" (Swift Mks. 1 to 6 have been announced to date).

Fairey and Hawker, the Minister of Supply said, are producing a version of the Hunter adapted to make use of the Fireflash, but this is expected to be of principal value for export, since more up-to-date missiles are expected to be available to the R.A.F. by the time the Fireflash-Hunter has been developed.

Meanwhile, from America comes the first illustration of an operational installation of air-to-air guided weapons—on a McDonnell F-101A Voodoo. Three Hughes GAR-1 Falcon missiles are grouped under the fuselage in a cluster in addition to two packs of H.V.A.R. tubes.

* * *

Although installation of the Fireflash is likely to be under the wings of the Swift and the Hunter, photographs of a trial firing in which a Firefly target drone was destroyed show it leaving the wingtip of a Meteor N.F.11.

Other recently released illustrations, this time of a ground-to-air missile trial, also showed a Firefly 8 in use as the target. Production of these drones has just terminated at Fairey's Stockport factory, but work is now in hand to convert some surplus Firefly 5s to the drone standard.

On the subject of Swifts carrying missiles, it is relevant to recall my note in *Air Pictorial* for November 1954, in which I referred to such an aircraft seen in the vicinity of

One of the two Auster Mk. 7s now with the Trans-Antarctic Expedition, WE600, at Husvik Harbour, South Georgia.

Hatfield. A recently published picture of the test aircraft fleet of de Havilland Aircraft Company (which company is known to be developing guided weapons) shows the Swift 1 WK204, together with a black-painted Meteor N.F.11, a Firefly 7 with special wingtip containers, and two Canberras with underwing pylons.

* * *

Referring last month to another de Havilland trials aircraft, the Engine Company's Sperrin, I assigned to it two Gyrons, but in fact the second test engine has not yet been fitted. The Gyron-Sperrin is now back in Belfast.

Flight trials are due to begin soon with the de Havilland Spectre, a powerful new rocket engine which has piloted-interceptor applications. As announced, the first test will be in a Canberra—actually the Nene-engined second prototype, VN813. One way and another the Canberra prototypes seem to be leading a useful life.

* * *

An attractively finished Viscount which I saw at Weybridge recently was the Type 734, registered J751. This is a V.I.P. version reserved for the use of the Governor-General of Pakistan; finished in the green and white livery of the Royal Pakistan Air Force, it bears the Governor's coat of arms on the nose. Other Viscounts nearing completion were the three Type 755s which were purchased by Airwork and then sold to Cubana. A profitable transaction, one imagines, since modern airliners for immediate delivery are not easily procured.

Over at Wisley, the sole surviving Wellington, MF628, made an interesting comparison with the Valiants, production of which is in full swing. I fear MF628 is distinctly unairworthy at the present time, and as it is unhangared and unattended, rapid action seems to be called for if it is to be preserved at all.

The Valiants now sport an interesting modification in the form of fittings for flight refuelling probes in the nose. The probe itself appears to be detachable, but even when it is not fitted the stub is visible above the di-electric radome. I have not heard of any refuelling trials involving Valiant B.1s so far, and it remains to be seen what aircraft will be used as tankers.

* * *

So much news of Viscount development has come to hand once again this month that I feel bound to give it in the now customary form, for the benefit of those readers following the series and at risk of boring those who are not! Orders for the Viscount, at the time of writing, total 303; about 100 have been delivered.

Type 700. Prototype G-AMAV now flying with Dart 510 (R.Da.6 engines). 400 m.p.h. achieved.

Type 745. Tenth aircraft for Capital Airlines, N7411, is first true 700D Series, with Dart 510 engines, more fuel and increased all-up weight. Fourth to ninth aircraft, N7405 to N7410, are Type 745 but have Dart 506s at present.

Type 749. Third aircraft is YV-C-AMZ. First Type 749 reached Caracas early in March.

Type 757. First aircraft of this type is CF-TGX. Additional order for eleven brings total of this type for T.C.A. to twenty-one.

Type 759. Two 700D Series for Hunting Clan registered G-AOGG and G-AOGH.

Type 770D. A new Series number to cover basic variant for North America incorporating experience with T.C.A. and Capital machines.

Type 771D. A new Series number for "plush" variant of the Series 770D.

Type 773. One Series 700D ordered by Iraqi Airways.

Type 781. One V.I.P. Series 700D for the South African Air Force.

Type 808. Three aircraft of the 800 series ordered by Air Lingus.

Type 810D. Continental order for this Series increased to fifteen from twelve, with further option on five. South African Airways order for seven announced.

* * *

A further alteration in B.O.A.C. Britannia types has been announced. The Corporation will now receive only two Type 302s, which have the longer fuselage of the Series 310 but the short range of the Series 100. The remaining five of this batch will be completed as Series 305s; this is a hybrid type, similar to the Series 310 and with the long-range wing, but with various internal differences from the 310 which call for the new designation.

* * *

If this column had a department headed "Miscellaneous Information", it would include, this month, a note that the Jet Provost demonstrator, G-AOBU, is now flying with wingtip tanks. This installation has previously been flown on a prototype Provost, WE530, as I reported as long ago as July 1954, and was shown in model form at the S.B.A.C. Show, 1955, on the second Jet Provost, XD675. A total of eleven Jet Provosts has been built; in addition to the civil machine they are the T.Mk. 1s XD674–680 and XD692–693, and the single T.Mk. 2 XD694.

Another piece of miscellaneous information is that the first flight of the Spitfire prototype K5054 took place twenty years ago on 5th March. The event was remembered on the B.B.C.'s telecast on that night with some interesting film sequences of the prototype taxying, and some film of Jeffrey Quill flying the Spitfire 5 AB910 (ex-G-AISU). Although painted in 1940 colours, this Spitfire never took part in the Battle of Britain; but can any reader produce proof that *any* cannon-armed Spitfires took part? I believe it is unlikely but have been challenged to prove it.

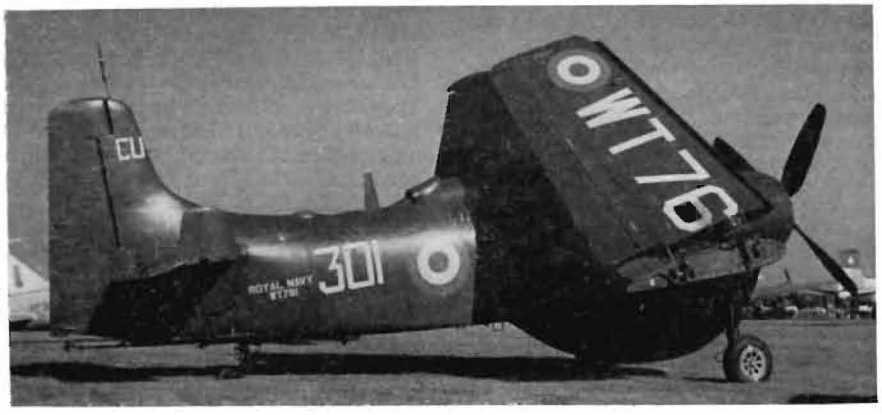
* * *

Ending, once again, on a vintage note, I hear and record with pleasure that plans are afoot to exhibit, in a glass-fronted pavilion at Adelaide airport, the Vickers Vimy "Silver Queen" in which Keith and Ross Smith made the first flight from England to Australia in 1920. It had been on exhibition in the National War Museum in Canberra but has now been dismantled and sent to Adelaide to await completion of the building planned by the Royal Aero Club of South Australia.

"*Aeroscribe*", *March* 1956

The "pen-nib" tail fairing can be clearly seen in this photograph of an F(AW)4 Javelin, XA630.

The serial number WT761, seen here on a Skyraider of No. 849 Squadron, legitimately belongs to a Hunter 4.



LAST OF A FAMOUS LINE

ROLLS-ROYCE'S Derby works have now built and delivered their last piston aero engine—a Griffon for a South African Air Force Shackleton. Since the first production aero engine manufactured by Rolls-Royce left this factory in December 1915, no fewer than 51,169 piston aero engines have been built there. These include the "R" engines which, installed in Supermarine seaplanes, won the Schneider Trophy outright for Great Britain in 1931.

A Hawker Hart (India) of the Indian Air Force flying near Ambala in 1940. (*Photo: Imperial War Museum.*)

COMMONWEALTH MILITARY SERIALS

By BRUCE ROBERTSON

India

AS early as December 1910 a Bristol biplane of box-kite type was flown in India during demonstrations to the British Army, and by 1912 aeroplanes had actually assisted in cavalry manoeuvres. The aircraft were not officially owned and no serialling system was therefore entailed. With the stationing of R.F.C. and later R.A.F. units in India, the British serialling system (*Air Pictorial*, Nov.-Dec. 1955) applied to all Service aircraft in India until World War II brought its changes.

In present times, when Communist propaganda has attempted to discredit the past British administration in India, it is gratifying to recall the numbered series of Indian Presentation Aircraft provided by voluntary contribution from the Indian peoples. PUNJAB No. 25, borne on R.E.8 No. C2298 in the 1914–18 War, indicates the response from that area alone. During the 1939–45 War the numbered series was mostly in twos and threes, but only because donations were on a parochial basis, each individual town or institution wishing to be identified with an aircraft in the common cause.

During the inter-war years, mainly standard general-purpose and light-bomber aircraft were used by the R.A.F. in India, the Bristol F2B, D.H.9A, Westland Wapiti and Hawker Hart. Several batches of Hawker aircraft deserve mention as having been built specially for operation in India. These were the Hart (India) K2083–2132, K3921–3922 and K8627–8631, Audax (India) K4838–4862 and K5561–5585.

An Indian Air Force was formed in 1933 under R.A.F. supervision. It consisted of a headquarters and one flight, later expanding to a squadron. All the aircraft used, Wapitis at first and Harts (India) later, were ex-R.A.F. machines and original serials were retained.

War brought a rapid expansion of the I.A.F. and the creation of an I.A.F. Volunteer Reserve, together with a flying training scheme utilising Indian flying schools and clubs. More aircraft were acquired from the R.A.F. and civil aircraft were taken over. For impressed aircraft, India was allotted certain blocks of numbers in the R.A.F. range under the prefix letter/letters T, V, AX, DG, DP, HK, HL, LR, LV and MA. Of particular interest were DG450–454, all ex-Atalanta four-engined airliners used by the I.A.F. for anti-submarine patrol. Following on at DG455 were most of the eighty-odd Tiger Moths impressed in the Dominion. Some aircraft in these ranges were certainly "spotter's posers"; for example MA929—a Zlin 212 Tourer!

From 1942 onwards, British military serials were by no means exclusive. Aircraft of the United States Tenth Army Air Force arrived in increasing numbers. Occasionally Chinese aircraft were to be seen, and even, at one time, Russian aircraft of an anti-malaria unit. On coastal duty some Catalinas serving with No. 321 Squadron R.A.F. bore the Dutch markings Y.45, Y.49 and Y.56. Some aircraft had two serials! This applied particularly to Waco Hadrian gliders transferred from the U.S.A.A.F. to the R.A.F. in India under Lease/Lend, e.g. a Hadrian Mk. 2, 43-42140, in American service, bore also FR778 after being taken over by the R.A.F.

The Indian Air Force with several operational squadrons continued to obtain aircraft through the R.A.F. and original serials were retained up until 1947 when the partition of India was effected.

After partition the Force reorganised and a new serialling system was introduced. As "Aeroscribe" pointed out in his journal for December 1955, the I.A.F. serials have the appearance of R.A.F. numbers, being on a two-letter/three-digit basis, but the sequence of allotment and the range of letters used is different. Blocks of numbers in a 100–999 range are given to each type of aircraft in service. The prefix letter immediately in front of the number indicates the type of aircraft. The first prefix letter denotes the series of type numbers, which so far have been only an "H" and an "I" series. Examples of type letters in the "H" series with a representative full number are: U—Tiger Moth (HU718), V—Prentice (HV 890), W—Devon (HW203).

The history of the Royal Pakistan Air Force before the partition of India in 1947 cannot be separated from the Indian Air Force, for both had the same origin. As a result of the division of the R.I.A.F.* on the partition, Pakistan received only a fighter and a transport squadron, the latter without equipment, compared to India's seven fighter and one transport squadrons.

Since that time many new aircraft have been obtained, chiefly from the United Kingdom, including Supermarine Attackers. Jet fighters numbered from R4000 in the R.P.A.F. system of seriation, the system being to allot blocks of numbers to each aircraft type in a range of up to four-digit numbers, with a single prefix letter, e.g. L934 Fury FB.60. Prefix letters started at "A" for Hawker Tempests with low numbers such as A128 or A152, and has progressed, as a recent photograph reveals, to "W" for Auster Aiglets with the highest number so far disclosed of W4106.

Rhodesia

RHODESIA'S first association with service aircraft was by donations during the 1914–18 War, to which Martinsyde Elephant A6286 in the Royal Flying Corps bearing the inscription "RHODESIA III" gave witness, but not until 1920 was an aeroplane actually seen in the Colony. This was a civil Vickers Vimy on the first England–Cape Town flight, and yet another six years were to elapse before the first military aircraft arrived, four Fairey IIIDs consecutively serialled S1102 to S1105, passing through in the first of several R.A.F. flights from Cairo to Cape Town.

The Southern Rhodesian Government in 1934 voted the sum of £10,000 to raise their own air unit. By 1937 the initial equipment, six ex-R.A.F. Hawker Harts (K2986, K3025, K3028, K3877, K3888 and K3889) had arrived for renumbering as SR1 to SR6. They were supplemented by other types the following year and when war came in 1939 nine machines (3 Dragon Rapides, 3 Harts and 3 Audax) left for their war stations in Kenya. Shortly afterwards, most of the remaining operational aircraft were taken over by No. 237 Squadron R.A.F. which became known as a Rhodesian Squadron. Nos. 44 and 266 Squadrons in the United

** The title Royal conferred in 1946 was dropped in 1950 when India became a Republic.*

Kingdom were also Rhodesian Squadrons by virtue of the policy of grouping together Rhodesian personnel serving with the R.A.F. The aircraft used by these units were provided entirely by the R.A.F., being in no way connected with Rhodesian serialling.

Under the Empire Air Training Scheme in Rhodesia there were to be seen aircraft bearing the serials of three Air Forces, excluding the Colony's own SR series. The Royal Air Force provided many Oxfords, Harvards and Tiger Moths which retained original serials, except that with the 94 R.A.F. Australian-built Tiger Moths supplied the "DX" prefix letters were painted out and in some cases an "MC" prefix substituted. The reason for this is not clear. As would be expected, South African Air Force serials were often seen, but somewhat surprisingly also Cornells with numbers such as 15116 of the Royal Canadian Air Force serialling system. Yet another example of close integration in the Empire Air Training Scheme.

After the war, Service aviation lapsed in Rhodesia until 1947 when the R.A.F. opened the Rhodesian Air Training Group, to be disbanded only six years later. By this time, however, the Southern Rhodesian Air Force had revived, re-forming from a nucleus of an Anson, a Dakota originally presented by Field Marshal J. C. Smuts and an ancient Leopard Moth that survived the war as SR22. In 1949 batches of ex-R.A.F. Tiger Moths, Austers and Harvards boosted the SR series, and by 1951 Rhodesian pilots were ready for operational aircraft, Spitfire F22s, by which SR100 was reached. Since then, small batches of more modern aircraft have been delivered including Vampire F.B.9 and T.11s, Provosts and Pembrokes. A glance at airport news columns also shows recent deliveries of ex-R.A.F. Dakotas in the SR152-158 range.

A change in the prefix letters reflects events in Central Africa. With the Federation of Southern Rhodesia, Northern Rhodesia and Nyasaland, the Air Force of Southern Rhodesia has become a Rhodesian Air Force and SR as a prefix, an anachronism. A Royal title too has been conferred, and therefore the prefix letters are now R.R.A.F. for Royal Rhodesian Air Force.

Spitfire F.5 R7275, was the second aircraft donated by the Bombay Gymkhana Club to the R.A.F. This aircraft operated by No. 54 Squadron was lost in action over the Channel on 4th June 1941. (*Photo: Imperial War Museum.*)

Ceylon

THE Royal Ceylon Air Force formed in 1949 is the youngest of the Commonwealth Air Forces, but Ceylon has had a much earlier association with military aircraft. To quote R.A.F. Spitfire X4606, bearing the inscription CEYLON IV in 1941, is to mention but one of a number of aircraft donated to the United Kingdom Government by the Ceylonese peoples in both world wars.

Two aircraft in the last war had a very close association indeed: VP-CAG was the civil registration of a D.H. Moth Minor in Ceylon purchased in 1941 by the C.-in-C. Ceylon for the East Indies Station and numbered NP490 in the Fleet Air Arm. At the same time a privately owned B.A. Swallow was impressed for naval communication duties at Trincomalee as NP491.

During the war several R.A.F. and F.A.A. squadrons and one Royal Canadian Air Force squadron were stationed in Ceylon. Since the war, the R.A.F. have been permitted to maintain a base and with their administrative assistance the Dominion's own Force was established. This formation is so recent, that a historical survey is not possible and contemporary details may not be in the best interests of this Service. However, one point is self-evident: the numbers used have a two-letter prefix. The first is constant, being "C" for Ceylon; the second is variable according to the class of aircraft, e.g. "CA" on a Balliol stands for Ceylon Advanced Trainer, and "CC" on an Oxford for Ceylon Communications.

Colonies and Protectorates

THE British Colonies have had their associations with aircraft serialling systems by aircraft donated by their peoples. To give Basutoland as a typical example: this Protectorate gave the cost of ten Sopwith Camels during the 1914–18 War, and in consequence the Royal Flying Corps machines B3865–3870 and B3877–3880 bore also the respective numbers BASUTOLAND Nos. 1 to 10.

Apart from the deployment of R.A.F. aircraft in Singapore and Malaya, some aircraft identified by their serials had a local association with this part of the world. The Hawker Audax K3720 was built specially for operation in the Far East and became the prototype of a variant known officially as the Audax (Singapore). Other Audax, e.g. K7515, were modified to this standard from 1936 onwards and supplied to the Straits Settlements Volunteer Air Force formed in March 1936. This Force, administered by the R.A.F., retained original serial numbers on their aircraft, but in addition an S.S.V.A.F. number was marked forward of the fuselage roundel. It was a simple numerical series starting with K3720 as "1".

A Malayan Auxiliary Air Force formed in 1940 with civil aircraft, gave useful service during the Japanese invasion, but by March, 1942 it had virtually ceased to exist. The aircraft used were identified by their civil registrations only.

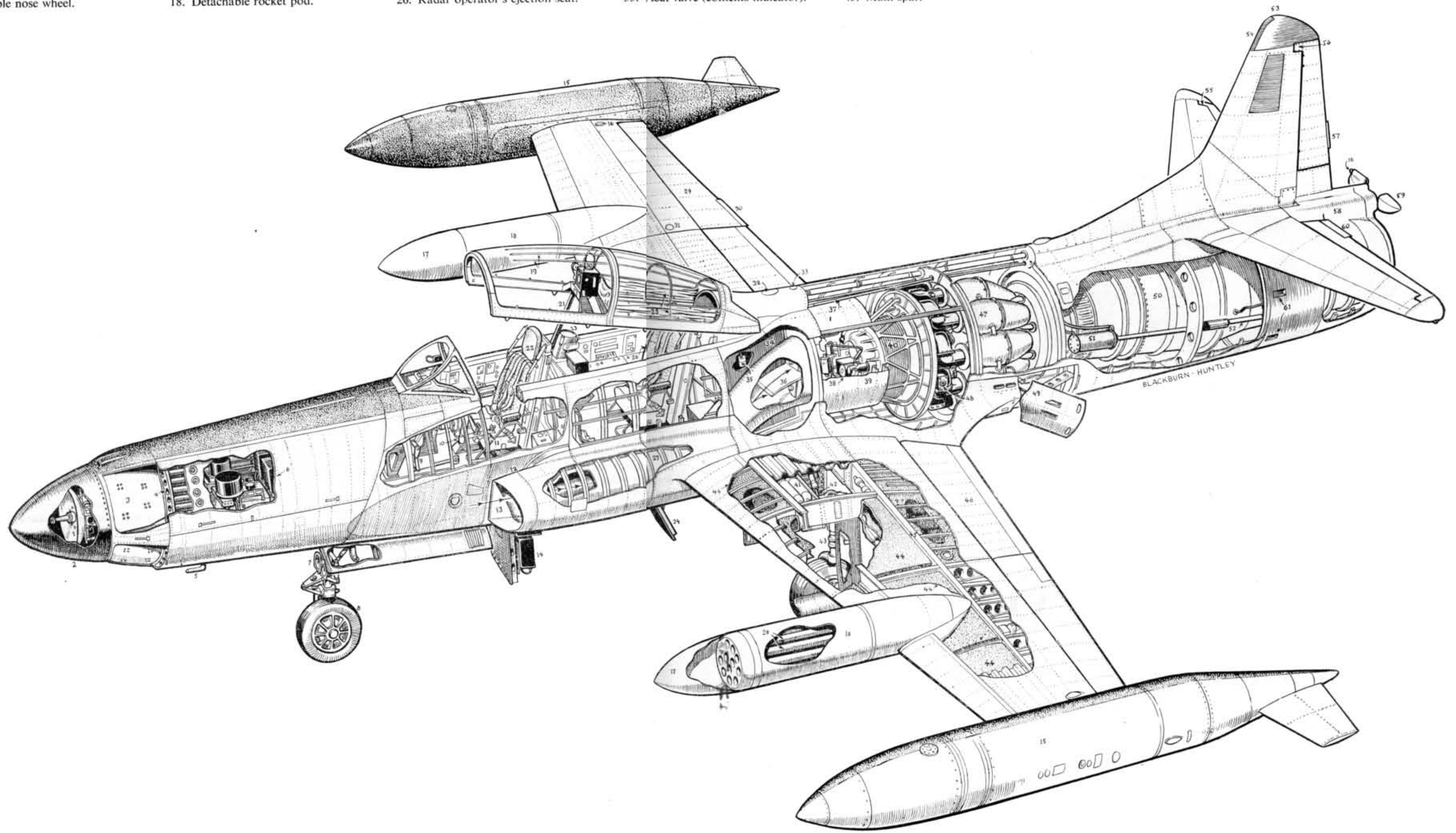
Burma as an ex-member of the British Empire must not be forgotten, for that a Volunteer Air Force existed in that country is little known, the Force having been annihilated by the Japanese shortly after its formation. Seriation was started on a two-digit, "Z" prefixed system, starting at Z-01 with a Tiger Moth.

As other colonies prepare for self-government within the Commonwealth, it is to be expected that the next few years will see the formation of new Air Forces, small in themselves but each with its own numbering system.

A Provost T.1 of the Royal Rhodesia Air Force with the new RRAF prefix to a number series which before the Central African Federation was prefixed SR. (*Photo: BR/SPB.*)

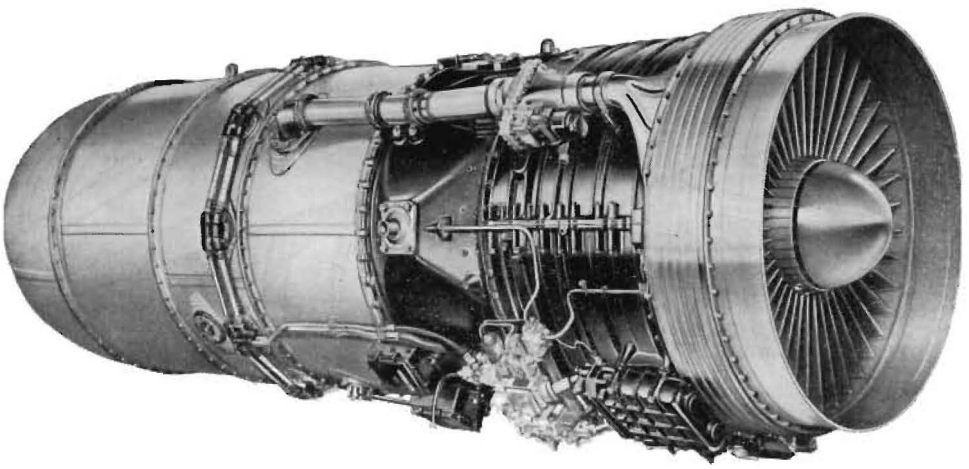
Lockheed F-94C Starfire (One Pratt & Whitney J48-P-5)

1. Search antenna.
2. Di-electric nose cap.
3. Hinged rocket doors.
4. Rocket tubes, 24 × 2.75-in. "Mighty Mouse" rockets.
5. Pressure head.
6. Hughes' search and fire-control installation.
7. Twin landing lamps.
8. Steerable nose wheel.
9. Rudder pedals.
10. Control column.
11. Engine controls.
12. Boundary layer "bleed".
13. Engine air intake.
14. Radio panel (hinged for access).
15. Fletcher wing tank.
16. Navigation lamp.
17. Frangible nose cap.
18. Detachable rocket pod.
19. AN/ARN — 6 radio compass sense antenna.
20. AN/ARN — 6 radio compass loop antenna.
21. Electrically operated canopy jack.
22. Pilot's ejection seat.
23. Target display cathode-ray tube.
24. Dive flap.
25. Black-out curtain.
26. Radar operator's ejection seat.
27. Intake ducting.
28. 12 × 2.75-in. "Mighty Mouse" unguided rockets.
29. Power-operated aileron.
30. Aileron trim tab.
31. Wing fuel tanks filler cap.
32. Fuselage fuel tank filler cap.
33. Water-alcohol tank filler cap.
34. Fuselage fuel tank.
35. Float valve (contents indicator).
36. Airflow guide vane.
37. Elevator and rudder push-pull rods.
38. Engine accessories.
39. Plenum chamber.
40. Compressor intake.
41. Oxygen cylinders.
42. Undercarriage retraction jack.
43. Main undercarriage.
44. Wing tank.
45. Main spar.
46. Flap.
47. J48-P-5 centrifugal turbojet; 9,000-lb. thrust with reheat.
48. Forward engine mounting.
49. Air brake.
50. Reheat unit.
51. Pneumatic cylinder.
52. Reheat eyelid operating rod.
53. Pick-axe antenna.
54. Di-electric tip.
55. Elevator mass balance.
56. Rudder mass balance.
57. Tab (ground adjustment).
58. Parachute brake housing (16-ft. dia. nylon ribbon).
59. Bungee-loaded doors.
60. Elevator trim tab.
61. Reheat cooling ducts.



HIGH THRUST · LIGHT WEIGHT

LOW CONSUMPTION



ROLLS-ROYCE

CONWAY

BY-PASS JET ENGINE

ROLLS-ROYCE LIMITED · DERBY · ENGLAND

Taking off for the first time is the North American F-100D, latest in the supersonic series of Air Force fighters. An autopilot and other improvements have been added.

Did You Know . . . ?

Spot Aviation News from all over the World

UNITED KINGDOM. The initial version of the Vickers N.113D will have four 30-mm. cannon but no fitments for guided weapons such as Fireflash. Its tactical A-bomb is expected to be centrally slung in a streamlined container as on the Douglas A4D Skyhawk. Later versions of the N.113 will have guided weapons in place of cannon.

● It has been confirmed recently that the air-to-air missile under development at de Havillands is of the heat homing infra-red variety. This is to be the ultimate standard weapon of such machines as the English Electric P.1.

● An Airborne Early Warning (A.E.W.) version of the Gannet is being developed to replace the present Skyraiders.

● Vickers have proposed a special freight/passenger version of the Vanguard airliner for use by Transport Command. It would be capable of carrying vehicles. Transport Command are also considering the Handley Page Herald and a completely new machine for which designs have been prepared.

● Bristol are concentrating mainly on development of the Bristol 173/193 with the Napier Gazelle turboprop. A development of the 173 with Gazelles is to be offered to civil operators.

● An American journal reports that Bristols are developing a Mach 2.2 research aircraft designated Bristol 22. The same source gives the power plant of the Saunders Roe SR.53 as two Gyron Juniors and one Spectre rocket.

● If present plans are carried through, the German Air Force may order 84 Hunting Percival Pembrokes, and the German Navy 36 Seahawks and 12 Fairey Gannets.

FRANCE. The Soviet Union is considering ordering the SE-210 Caravelle for Aeroflot. A mission is shortly to go to SNCASE to discuss the matter and examine the aircraft.

● The twelve Mystère 4A jet fighters for Israel, held up for political reasons, are now to be delivered. Also destined for Israel is a batch of SS.10 ground-to-ground anti-tank missiles made by Aeronord.

● It is rumoured that a higher-performance version of the SO-4050 Vautour is being developed. Some reports say the power plant will be the SNECMA Atar 8 or the Bristol Olympus.

● The Dassault MD.550 jet plus rocket delta has been named the "Mirage".

● Orders for the Fouga Magister total 325, deliveries to go on through 1956–58.

U.S.A. The training version of the Ding Dong atomic warhead ground-to-air missile has the amusing name of "Tingaling". Power plant of both missiles will be a Rocketdyne (North American) liquid-fuel rocket motor.

● Convair are anxious to continue in the medium-range airliner field after the Convair 440 line finishes. They are at present considering a medium-haul pure-jet transport of large size with four General Electric J.79 turbojets.

● The first production Lockheed F-104A supersonic interceptor powered by a G.E. J.79 flew in February from Edwards A.F.B. Lockheeds have offered to the Air Force a new version of the F.104 for all-weather interception. It will have a miniature A.1 radar scanner in the nose, and will carry two Hughes Falcon air-to-air missiles.

● The prototype Cessna 620 feeder-liner is expected to fly this month.

● The designation of the Super Aero Commander 680s for the U.S. Army is L-26C.

● The McDonnell F.101A Voodoo carries three Hughes Falcons and two clusters of three unguided folding-fin rockets under the fuselage forward of the intake line.

● Twenty-one companies—most of them in the aircraft industry—have been engaged to supply thousands of parts and components for the U.S. Air Force's new Convair B-58 Hustler, the supersonic bomber now in initial production at Fort Worth.

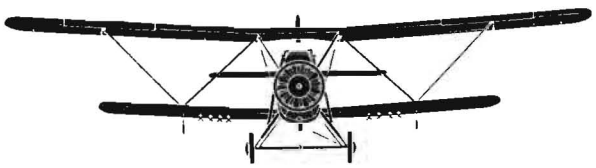
MISCELLANEOUS. The Japanese forces now possess a total of 604 aircraft of which 327 belong to the Air Force.

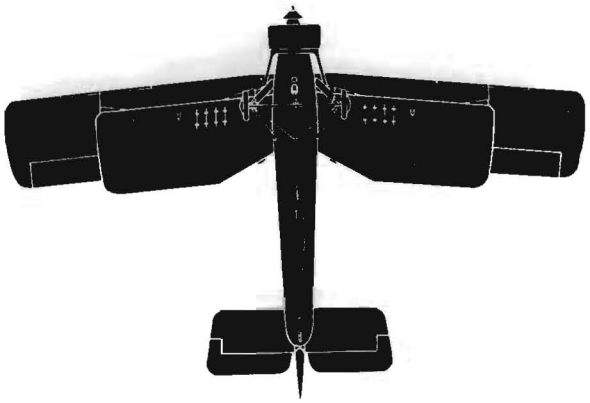
● Germany's fighter, fighter-bomber and reconnaissance squadrons will apparently use the F-84F/RF-84F and the F-86K as standard equipment.

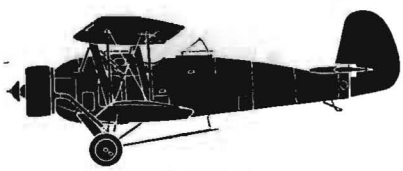
● The German Government has ordered 428 Dornier 27 four-seat observation/liaison aircraft.

A six-seat military utility transport in the de Havilland Beaver class, the Max Holste 1521 is now in production for the French Air Force. The first twenty-seven M.H.1521s will be completed by the end of 1956. Powered by a 450-h.p. Pratt & Whitney Wasp R-985-AN1 radial, the Broussard has a maximum speed of 168 m.p.h. and a range of 745 miles. Span is 51 ft. 7¾ in. and length 28 ft. 2½ in. Photograph shows the prototype, M.H.1521-01, "Z".

ARMSTRONG WHITWORTH A.W.17 ARIES





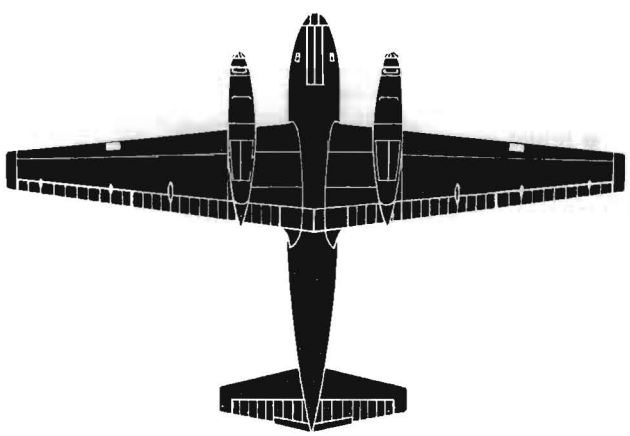


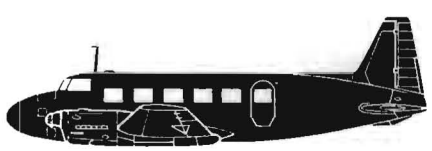
Another lesser-known British military prototype of the late 1920s is the Armstrong Whitworth A.W.17 Aries, a two-seat Army Co-operation general-purpose biplane. Fortunately a general arrangement drawing, prepared for the Air Ministry and traced on 15th April 1929, survived the war-time bombing of A.W.A.'s Coventry offices. The only noticeable difference between the drawing and the actual 1929 prototype J9037 is a Townend ring cowling over the 460-h.p. Armstrong Siddeley (special geared) Jaguar IV.

Only one prototype was built. Tested in 1930, the Aries Mk. I was virtually a twin of the more successful Type 137 Atlas Mks. I and II which served with the R.A.F.

Data: Manufacturer: Sir W. G. Armstrong Whitworth Aircraft, Ltd., Coventry, Warwickshire, England. Design No. and name: A.W.17 (Type 130 of September 1927) Aries Mk. I. Powerplant: One 460-h.p. Armstrong Siddeley (special geared) Jaguar IV air-cooled radial driving a 10 ft. 6 in. diameter fixed-pitch, wooden airscrew at 2,200 r.p.m. (max.) and 2,000 r.p.m. (normal). Dimensions: mainplane, upper 42 ft. 0 in., chord 6 ft. 7 in., lower 28 ft. 11 in., chord 5 ft. 7 in., mainplane gap 5 ft. 7½ in.; length 28 ft. 4¼ in.; height 10 ft. 11 in. Total areas: wings 399.4 sq. ft.; ailerons 44 sq. ft.; tailplane 50.9 sq. ft. (volume coefficient 0.301); elevator 19.1 sq. ft.; rudder 20.75 sq. ft. (volume coefficient 0.045). Mainwheel track 7 ft. 2½ in. Tankage: petrol 75 Imp. gal.; oil 7 Imp. gal. Loadings: power 9.25 lb./h.p.; wing 10.6 lb./sq. ft. Other details including performance are not available in the manufacturer's files.

POLISH C.S.S. 12





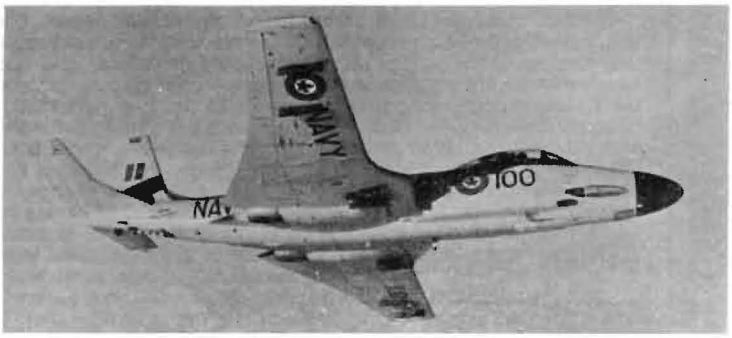
Design work on Poland's second post-war feeder-liner began in Warsaw in 1948 under the general direction of Prof. F. Misztal, a pre-war member of the P.Z.L. design staff. Two years later the ten-passenger C.S.S. 12 (SP-BAR) began a series of test flights which continued on into 1951.

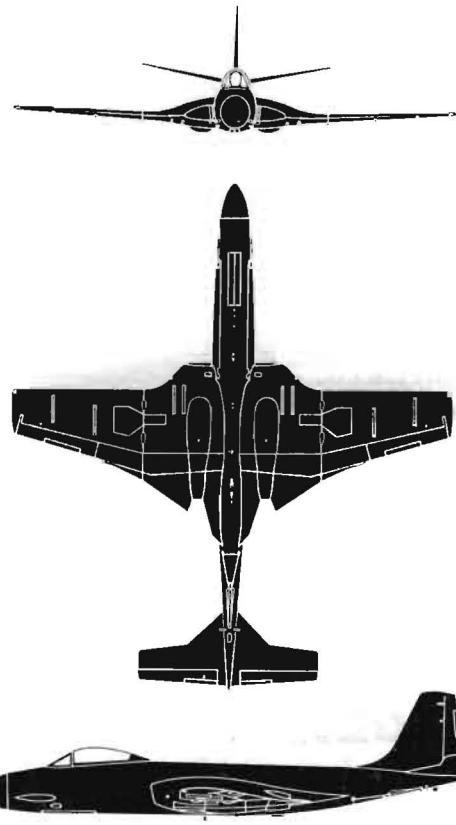
Prof. Misztal was also responsible for the two earlier phases of the C.S.S. programme, namely the design and manufacture of primary trainer and aerobatic prototypes. This resulted in the C.S.S. 10A (1948) and the C.S.S. 10C (1949) primaries and the C.S.S. 11.

Salient features: In the same class as the French Sud-Ouest SO.94R and tailwheel SO.95 Corse II (and using the same basic Argus 12-cylinder inverted-vee inline "power eggs"), the C.S.S. 12 bears a superficial resemblance to the smaller and lighter D.H.104 Dove/Devon series of feeder-liners. The unusual plan-view shape of the nacelles is due to the forward and sideways (through 90 degrees) retracting main undercarriage legs which, like the backwards-retracting nosewheel, and the double-slotted, camber-changing flaps, are hydraulically operated.

Data: Manufacturer: Centralne Stadium Samolotów of Z.P.L. (United Aircraft Industry), Warsaw, Poland. Powerplant: two 580-h.p. (390 h.p. at cruising altitude of 8,500 ft.) Argus As 411 TA air-cooled inlines. Accommodation: ten plus two crew. Dimensions: span 60 ft. 8½ in.; length 41 ft.; height 16 ft. 9¼ in.; wing area 431.636 sq. ft.; assect ration 8.53. Weights: empty 7,717.5 lb.; payload 2,205 lb.; loaded 12,127.5 lb. Performance: maximum speed (at approximately 8,000 ft.) 226.67 m.p.h.; cruising speed (at 2/3rds t.o. power) 198.72 m.p.h. at 8,500 ft.; minimum speed 62.1 m.p.h.; climb rate (maximum a.u.w.) 1,280 ft./min.; service ceiling 19,692 ft.; range 745 miles.

McDONNELL F2H-3 BANSHEE



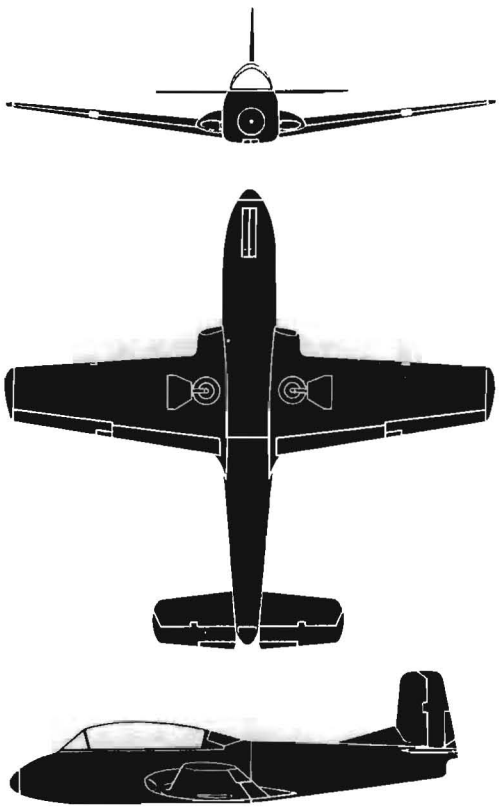


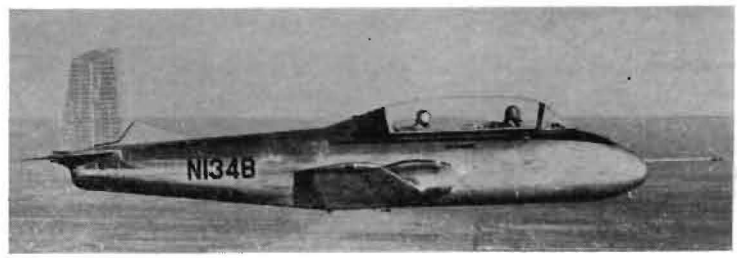
The Royal Canadian Navy's first jet fighter squadron, VF-870, is now working up with the F2H-3 Banshee, of which 30 are on order for the service. The U.S. Navy took delivery of the 55th and last F2H-3 in October 1953. Earlier versions of the Banshee had included the F2H-2N with lengthened radar nose and the F2H-2P with cameras in the nose. Some 175 of the earlier standard F2H-3 were built for the U.S. Navy.

Salient features: Special recognition points on the Banshee are the unusually-shaped wing set well back on the fuselage, the slim rear fuselage, and the tailplane set aft of the fin. The cockpit is set well forward over the nose and the broad oval intakes are contained in large bulges in the wing roots. The intakes form a step at the root leading edge, while the jet pipes are situated in channels in the trailing edge which has considerable curved taper. Wingtips are blunt. The fin is tall and square-cut with a small dorsal fillet, while the tailplane is square-cut with extensions on the inner halves and marked dihedral in the head-on view. Wings fold upwards, main undercarriage legs retract outwards, and the nosewheel backwards.

Data: Manufacturer: McDonnell Aircraft Corp., St. Louis, Missouri. Power: two J-34-WE-34 turbojets of 3,250-lb. thrust each. Accommodation: single-seater. Dimensions: span 44 ft. 11 in.; length 47 ft. 6 in.; height 14 ft. 5 in. Weights: gross weight over 19,000 lb. Performance: maximum speed 600 m.p.h.; cruising at altitude over 500 m.p.h.; initial rate of climb 9,000 ft./min.; service ceiling above 50,000 ft.; maximum range 2,000 miles with tip tanks.

BEECHCRAFT MODEL 73





A direct conversion of the Beech Mentor, as was the jet Provost of the standard Provost, the Model 73 has been offered for sale as a basic trainer anywhere in the free world. At present one of its limiting factors seems to be high price. Major differences in the Model 73 from the Mentor (apart from engine) are a full, clear-view hood with rounded windscreen, built-up rear fuselage to house the jet pipe, bulged wing roots for the intakes, and an increase in the size of the dorsal spine. So far the Model 73 is a purely private venture as is shown by its civil markings.

Salient features: A low-wing all-metal monoplane, the Model 73 has smooth lines accentuated by the long, clear canopy which is reinforced at the back. The nose forward of the cockpit is short and blunt. Wings have maximum taper on the trailing edge, blunt tips and long, narrow intakes at the bulged roots. Dihedral is from the roots. The fin is tall and square-cut with a prominent dorsal spine, while the rectangular tailplane is set on the fuselage top line. The nosewheel retracts backwards and the mainwheels inwards.

Data: Manufacturer: Beech Aircraft Corp., Wichita, Kansas. Power: one Continental J-69-T-9 turbojet (licence-built Marboré) of 880-lb. thrust. Accommodation: two seats in tandem. Dimensions: span 32 ft. 9 in.; length 30 ft. 1 in.; height 9 ft. 11 in. Weights: all-up 4,521 lb. Performance: maximum speed 291 m.p.h. at 15,000 ft.; stalling speed 69 m.p.h.

26,132,012 miles

were flown by BEA aircraft during the year ending January 31st in serving 67 airports in Great Britain, Europe and North Africa. In the course of these operations BEA carried 2,174,333 passengers — 234,412 more than in the previous year.

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AIRWAYS

FRANCE'S MACH ONE FIGHTERS

(*Continued from page 121*)

The fuselage of the Griffon presents many unorthodox approaches to the problems of high-speed design ase reference to the drawings will confirm. However, the most outstanding departure—and one which may be adopted by other designers—is the repositioning of the fin-mounted horizontal trim surfaces to the fore part of the fuselage. Since, like the Gerfaut, the delta wing is already equipped with ailerons and elevators, the purpose of the trim surfaces is to effect increased lift at high Mach numbers. Passing through the "sound barrier" results in a loss of lift and a nose-down change on conventional aircraft. M. Galtier believes that instead of having to put a down-load on a tailplane (negative incidence), it is more efficient to have a "nose-plane" which can be given increased incidence and gain the bonus of additional lift at the same time.

The wing thickness/chord ratio appears to be less than 6 per cent, and, unlike the Gerfaut's wing-housed main undercarriage, that of the Griffon has to be contained in the fuselage. The approximate span of the Griffon is 22 ft. and the length 33 ft. It is in the plan view that the Griffon shows the "V-2"-like nose-to-tail shape, and in this respect only it resembles the new Trident II.

SNCA DU SUD-OUEST SO 9050 TRIDENT II

The SO 9050 is one of the first of the new generation mixed-powerplant interceptor designed to exceed Mach 1.6 and to operate above 60,000 ft. The prime function of the SO 9050 Trident II is to climb quickly and to intercept bombers before they can reach their target. In this respect the Trident II is capable of exceeding Mach unity whilst climbing to interception height. The armament consists of fuselage-housed batteries of MATRA air-to-air homing missiles which may be fired in groups or altogether.

Like the Trident I, the SO 9050 Trident II has wingtip-mounted turbojets—two 1,640-h.p. Marcel Dassault MD 30s (licence-built Armstrong Siddeley Viper ASV.5s)—but the fuselage-housed liquid-fuel rocket power has been stepped up from three to four SEPR 251 rocket units which can deliver a total thrust of more than 11,000 lb. s.t. for about five minutes. This increased rocket power has necessitated a fuselage of greater diameter than that of the SO 9000.

No parachute brake is fitted because the wing loading at landing —with the rocket fuel exhausted—is believed to be less than 40 lb./sq. ft. Apart from the absence of the "needle-nose" yaw meter—although the nose is still sharply tapered—the main external difference immediately apparent is in the increased length of the undercarriage and the revised-shape wheel doors. The wing area is about 100 sq. ft. for a span of approximately 28 ft. The length is about 48 ft. and the loaded weight in excess of 11,000 lb.

CHARLES W. CAIN

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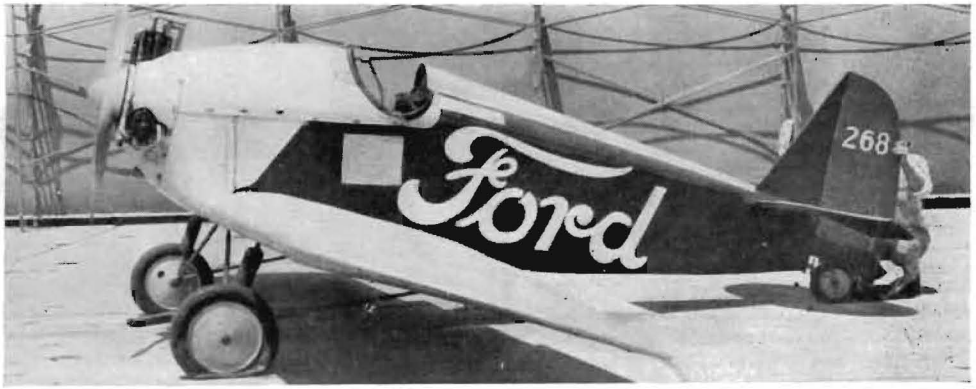
STAPLES

PHOTOS BY REQUEST



Difficult to photograph on most occasions because "268" is normally in the Ford Museum, Detroit, this only remaining example of the famous Ford Flivver was given an airing at the 1953 Detroit air show at Wayne Major Airport. Two were built, the other crashed into the sea and killed the pilot. Note the exceptionally large tail wheel. (*Photo: Brian Baker, Belleville, Mich., U.S.A.*)

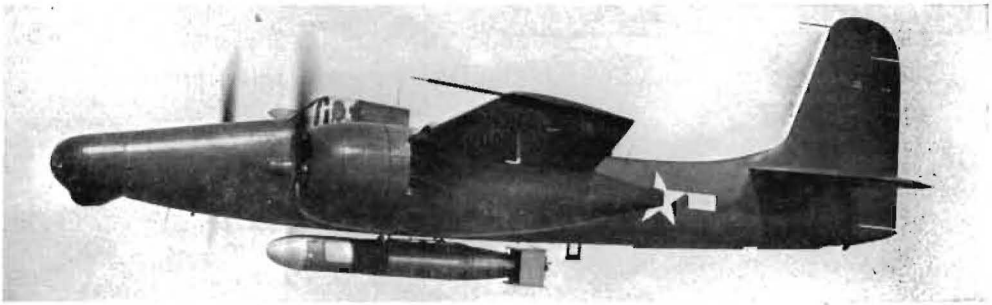
Lt. Nils Rodéhn poses with a Swedish Army Thulin typ (Type) K single-seat fighter. Eighteen Thulin Ks were built in 1917, sixteen going to the Dutch Army in 1920. In 4½ years, 1914–18, Dr. Enoch Thulin designed fourteen types and six engines. Type K had a 105-h.p. Thulin A rotary which gave a maximum speed of 93 m.p.h.; cruise, 81 m.p.h.; landing, 53 m.p.h. Climb, 3,300 ft. in 4 min., with ceiling of 20,000 ft. Span, 29 ft. 9 in.; length, 21 ft. 4 in. (*Photo via: Bjorn Karlstrom, Bromma, Sweden.*)

This, J7498, was the first of three Handley Page H.P.28 (Type C.7) Handcross day bombers built in December 1924 to Air Ministry Spec. 26/23. Later, carrier landing trials were conducted with this massive 60-ft. span, 3-bay biplane. Carrying a crew of two, the Handcross was powered by a 650-h.p. Rolls-Royce Condor Mk. III water-cooled engine which gave a maximum speed of 117 m.p.h. for an a.u.w. of 7,480 lb. Time to 6,000 ft. was 7 min. Length, 40 ft.; height, 13 ft. 6 in. (*Photo via: Arthur W. J. G. Ord-Hume, Pinner, Middlesex.*)

The single-seat Short Monoplane was designed and built at Eastchurch in 1911, where the famous balloon-manufacturing brothers Short set up the world's first production line of aircraft. The likeness of the 1911 Short Monoplane to the earlier Bleriot types is obvious, but the brothers Short stressed their first monoplane to withstand hard use. The undercarriage was especially rugged. Commander C. R. Samson, R.N., undertook the first flights in February 1912. Powered by a 50-h.p. Gnôme seven-cylinder rotary driving a two-blade Chauvière wooden airscrew, the monoplane had a maximum speed of 60–65 m.p.h. Span, 29 ft. 3 in.; length, 25 ft.

The Polish three-seat RWD-13 first appeared about 1937 as a cabin tourer of mixed wood and metal construction with fabric covering. The Germans used RWD-13s as air ambulances in World War II. After the war, two RWD-13s, VQ-PAL and 'PAM (and a suspected third, VQ-PAF) found their way to Palestine and served with Aviron Ltd. and were used for charter and joy-riding. The original Czech 130-h.p. Walter Major 4-1 inline was replaced by a 130-h.p. D.H. Gipsy Major. RWD stands for the names of the three designers, Rogalski, Wigura and Drzewiecki. VQ-PAL, illustrated, was taken at Ramlah in Palestine, 1948.

Grumman F7F Tigercats were used by the U.S. Marine Corps from land bases during the latter stages of the World War II Pacific campaign. In all 364 were built with sub-types F7F-1 to '-4. Illustrated is a U.S.N. radar "droop snoot" F7F-3N (night fighter) illustrating for the first time that the T-cat could mount a 22-in. torpedo. Max. speed, 425 m.p.h. on two 2,100-h.p. P. & W. R-2800-22 radials. Span, 51 ft. 6 in.; length, 45 ft. 5 in.; a.u.w., 21,650 lb.



Convair Conversion

By HAROLD G. MARTIN

The Husky Mk. II (Convair L-13A) with a Lycoming R-680-13 engine.

THE conversion of surplus Convair L-13A type aircraft by Caribbean Traders Inc. of Miami, Florida, has recently opened a new phase of small field and strip operations in the mountainous West Indies Islands and similar terrain of South and Central America.

Now named the Husky, the L-13A has been modified into a safe private aircraft, all of its original poor characteristics have been corrected and overcome after many hours of engineering study and test flying. The wing and stabiliser folding features have been left intact so that tropical and arctic storage and maintenance can be accomplished in a small confined area.

Three power plants are available for the Husky conversion: the Mark I, will retain its original power plant, a Franklin 0-425-9 of 245 h.p.; the Mark II will be powered by a Lycoming R-680-13 of 300 h.p.; and the Mark III will have a Pratt & Whitney R-975-7 of 450 h.p. All models but the Mark I will feature a swinging motor mount and quick-disconnect firewall fittings for easy maintenance. A constant-speed Hamilton Standard propellor replaces the wooden variable-pitch type on all Mark II and Mark III conversions.

Accommodation can be varied from two to eight seats and, with quick-disconnect type seats removed, cargo tie-downs or two stretchers can be installed in a few seconds. Doors fold down and outward and the centre post is removable to make cargo loading an easy task.

Already two Husky Mk. II aircraft are operating for foreign airlines, one in the Dominican Republic (for Campañia Dominicana de Aviaçion) and the other, recently delivered, with Société Aerinne de Transports Guyanna-Antilles (SA.TGA) Aerienne. This latter is based at Cayenne, French Guiana, and serves Martinique, Guadeloupe and other small French island possessions in the Lesser Antilles group that have previously been served with expensive amphibian-type aircraft at the great risk of open-sea landings. It is also flying into a 300-foot strip deep in the interior of French Guiana to supply a small mining operation with supplies and machinery. The one-week journey by boat, horse and foot to this remote mine location is now a matter of a 20-minute flight.

Performance figures for the Mk. II Husky include: Cruising speed 121 m.p.h. at 4,016 lb.; optional fuel capacity permitting a cruising range of 400 to 700 miles; take-off distance at sea-level is 125 ft. (empty: weight 2,045 lb.) and 255 ft. at two-thirds of gross weight (2,650 lb.); landing distance is 75 ft. Overall dimensions remain the same as the original L-13A aircraft.

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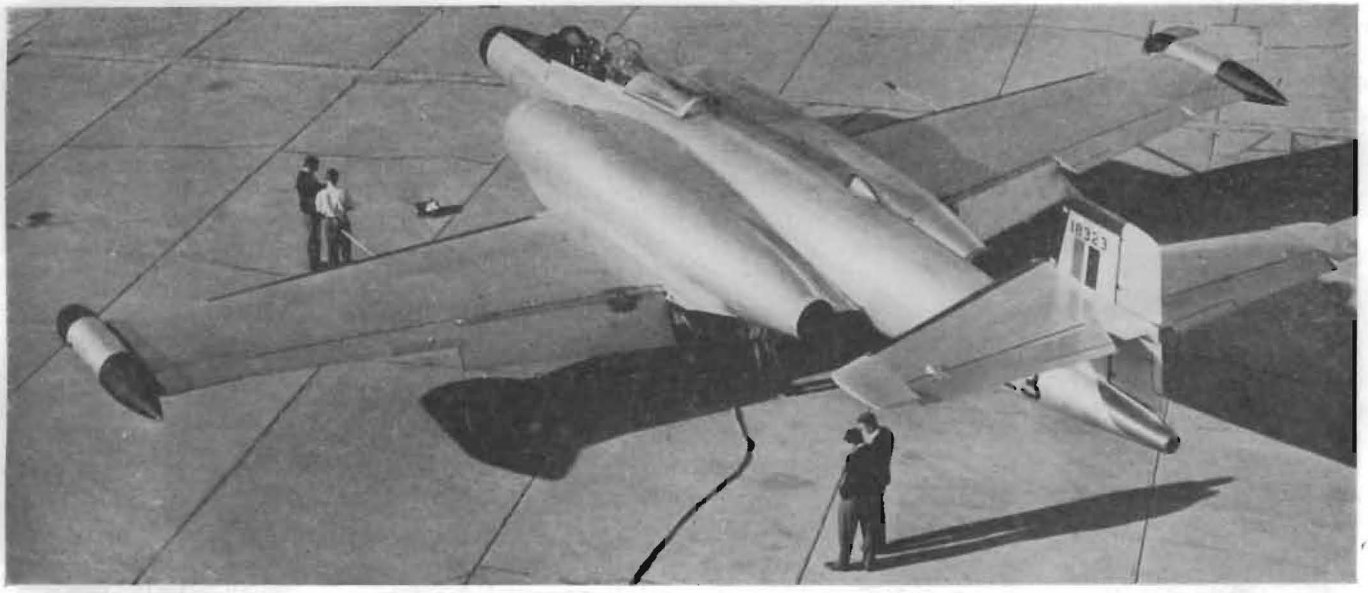


First photograph to be released of the revised Mark 5 version of the Avro CF-100 which has been developed as a high-altitude photographic-reconnaissance version of the CF-100 Mk. 4 two-seat all-weather fighter of the R.C.A.F. The Mark 5, now in production at Malton, Ont., will also be used as a high-altitude interceptor, the armament being six Hughes F-98 Falcon homing missiles under each wing. Major differences to the earlier marks are in shape and powerplant. Both wings and tailplane are of increased span, the area being tacked on to the tips. The extra wing area appears to be of constant chord. The later Mark 14 Orenda axials (as in Canadair Sabre Mk. 6) has been substituted in place of the earlier Orenda Mk. 11s, although there is no increase in the rated power of 7,000-lb. s.t. The increased wing and tailplane spans extend from outboard of the normal Mark 4s leading-edge Goodrich de-icing boots which appear as thick dark lines in the photograph.

Climbing at an angle of 45 degrees, the first prototype Fairey Delta 2 (WG774) is flown by Lt.-Commander Peter Twiss, D.S.C., prior to the successful attempt on the world's speed record on 10th March, when Twiss established the F.A.I. record of 1,132 m.p.h. (1,822 km./hr.) over a nine-mile course between Chichester and Ford, Sussex. Two runs were made, the first (east to west) was covered at 1,117 m.p.h. (1,798 km./hr.) and the second (west to east) at 1,147 m.p.h. (1,846 km./hr.), thus exceeding by 37 per cent the existing record of 824 m.p.h. set up by Col. Horace A. Hanes in an F-100A Super Sabre on 20th August 1955. The Delta 2, powered by a 10,000-lb.s.t. Rolls-Royce (re-heat) Avon, undertook the record runs at an altitude of $7\frac{1}{4}$ miles (38,000 ft.) after taking off from A. & A.E.E., Boscombe Down, Hampshire. The span of the FD-2 is 26 ft. and the length 52 ft. 3 in. First flight was on 6th October 1954.

Photo Review

The April edition of PHOTO REVIEW places on record for the first time several fascinating types, including the capacious Wildcat, the elusive Convair Model 110 and the Flying Tigers' photo-survey Mosquito.

Photographed at Miami recently—a five-seat Wildcat! N777A is a modified FM-2 (R.N.: Grumman Wildcat Mk. VI) originally built as a fighter for light escort carriers in 1944 by the Eastern Aircraft Divn. of G-M Corpn. The four passengers each have a separate window (by the trailing edge). The bulky radio mast and the deck arrester gear have been deleted. (*Photo: Harold G. Martin, Miami, Fla., U.S.A.*)

Seen at Le Bourget, F-OASS, a Consolidated-Vultee Liberator C. Mk. VII (c/n. 11; ex-AM920; G-AHYB), is normally based at Rabat by the owners, A.C.A.N.A. (*Photo: J. J. White, Croydon, Surrey.*)

Two Canadair North Star Freighters (CF-TFJ and 'TFV) are operating between Montreal and Vancouver No. 210 "Flying Merchant" (CF-TFJ) is shown here (*Photo: G. A. Fuller, Montreal, Canada.*)

A 1946 production five-seat de Havilland (Canada) D.H.83C Fox Moth (CF-EVK) photographed at Cartierville recently. A D.H.82C Tiger Moth is in the background. (*Photo: G. A. Fuller, Montreal.*)

Formerly G-AHGN and now N558E, this Percival P.44 Proctor V was used by Mr. Peter G. Masefield when he was the first Civil Air Attaché at Washington. (*Photo: Leo J. Kohn, Milwaukee, Wis., U.S.A.*)

Now used as a glider tug, HB-RAA is a 1931 Swiss-built Dewoitine D.26-C.1, formerly an air force single-seat fighter and advanced trainer. Six are still airworthy. (*Photo: J. J. White, Croydon.*)

An unusual twin-boom, all-metal, vee-braced cabin monoplane is the 1951 Trella Experimental. Pusher power is an 85-h.p. flat four. (*Photo: Robert P. Straub, Amelia, Ohio, U.S.A.*)

Ninety-three Fairchild Packets were declared surplus to U.S.A.F. troop carrier requirements in the spring of 1955. In the January issue of *Air Pictorial* appeared a photograph of N2047A, a C 82A-65-FA—the first to visit Europe. Other civilian-registered Packets noted recently in Miami include a rare Uruguayan, CX-AQA (*right*), and a Panamanian, HP-219. (*Photo: Harold G. Martin, Miami.*)

Something for the record! Photographed this year at Miami, a high-speed photo-survey Mosquito recently acquired by the Flying Tiger Line. Apart from a revised nose (extended to take vertical cameras) N1203V appears to be a standard ex-U.S.A.F. F-8. Forty were purchased from D.H. (Canada) in 1943 from the production line of B. Mk. XXs. (*Photo: Hal. G. Martin, Miami.*)

An old-timer still going strong is this Canadian Fairchild Model 71-C built in 1929. Sporting Mexican letters XA-CUC, the 71-C can carry six passengers at 106 m.p.h. (*Photo: William T. Larkins, Corncord, Calif., U.S.A.*)

Painted a vivid red over all, this Lockheed Shooting Star (44-85462) is a pilotless drone (QF-80A-LO) used for radiation sampling after atomic explosions. (*Photo: Hal. G. Martin, Miami.*)

Little publicised and hitherto unpublished in *Air Pictorial* is this special maritime patrol/anti-submarine version of the Breguet Deux-Ponts—the Br.764. Note the tip tanks and the dorsal/ventral turrets and radomes. (*Photo: Inf. Aeronautiques, France.*)

Mystery Meteor? We invite readers to tell us what Mark of Meteor is illustrated. On each wingtip is a large, streamlined car-type headlamp. The radome does not house radar equipment. (*Photo: David H. Cotterell, Reading, Berkshire.*)

One of a small number of 1918-vintage Curtiss "Jennies" which appears at U.S. meetings is this re-motored JN-4D—Ranger inline—NX2939, owned by the Hardwick Aircraft Co. of Rosemead, Calif. Insigne on the fuselage embraces a spread-winged hawk and the legend "Sammy Mason's Hollywood Hawks". (*Photo: Hal. G. Martin, Miami.*)

First photograph of a French Air Force Cessna L-19A Bird Dog which has operated in Indo-China on artillery observation. The U.S. contract serial "112694" has been retained in yellow on the green fin. The whip aerial is over 6 ft. tall. Behind it is an open D/F loop. (*Photo: JM/SPB., France.*)

The discovery of 1956! Many English experts are amazed to learn that the Convair-liner's precursor, the Model 110, was in fact built and flown. Here, through the good offices of Warren M. Bodie of N. Hollywood, Calif., we can illustrate for the first time the one-off prototype, NX90653. For further details see page 142. (*Photo: Otto Menge, San Diego, Calif., U.S.A.*)

British Civil Register News

NEW REGISTRATIONS

G-ANWJ Bristol 170 Mk. 32 (13254)—Bristol Aircraft Ltd.
G-ANWK Bristol 170 Mk. 32 (13259)—Bristol Aircraft Ltd.
G-ANWL Bristol 170 Mk. 32 (13260)—Bristol Aircraft Ltd.
G-ANWM Bristol 170 Mk. 32 (13261)—Bristol Aircraft Ltd.
G-ANWN Bristol 170 Mk. 32 (13262)—Bristol Aircraft Ltd.
G-AOFA Bristol 175 Britannia 312 (13207)—Bristol Aircraft Ltd.
G-AOFY D.H.114 Heron 1B (14099)—B.E.A.C.
G-AOGV Auster J5R Alpine (3302)—N. A. Rogers
G-AOGW D.H.114 Heron 2 (14095)—Vickers-Armstrong (Aircraft)
G-AOGX Douglas C-47 Dakota (43-16311)—Field Aircraft Services (Previously AP-AED)
G-AOGY D.H.82A Tiger Moth (R5023)—Muir and Adie Ltd.
G-AOGZ Douglas C-47 Dakota (KN628)—Derby Aviation
G-AOHA Vickers Viscount 802 (150)—B.E.A.C.
G-AOHB Vickers Viscount 802 (151)—B.E.A.C.
G-AOHC Vickers Viscount 802 (152)—B.E.A.C.
G-AOHD Vickers Viscount 802 (153)—B.E.A.C.
G-AOHE Vickers Viscount 802 (154)—B.E.A.C.
G-AOHF Vickers Viscount 802 (155)—B.E.A.C.
G-AOHG Vickers Viscount 802 (156)—B.E.A.C.
G-AOHH Vickers Viscount 802 (157)—B.E.A.C.
G-AOHI Vickers Viscount 802 (158)—B.E.A.C.
G-AOHJ Vickers Viscount 802 (159)—B.E.A.C.
G-AOHK Vickers Viscount 802 (160)—B.E.A.C.
G-AOHL Vickers Viscount 802 (161)—B.E.A.C.
G-AOHM Vickers Viscount 802 (162)—B.E.A.C.
G-AOHN Vickers Viscount 802 (163)—B.E.A.C.
G-AOHO Vickers Viscount 802 (164)—B.E.A.C.
G-AOHP Vickers Viscount 802 (165)—B.E.A.C.
G-AOHR Vickers Viscount 802 (166)—B.E.A.C.
G-AOHS Vickers Viscount 802 (167)—B.E.A.C.
G-AOHT Vickers Viscount 802 (168)—B.E.A.C.
G-AOHU Vickers Viscount 802 (169)—B.E.A.C.
G-AOHV Vickers Viscount 802 (170)—B.E.A.C.
G-AOHW Vickers Viscount 802 (171)—B.E.A.C.
G-AOHX Westland Sikorsky S.51 (Mk. 1A) (WA.H.139)—Westland Aircraft Ltd.
G-AOHY D.H.82A Tiger Moth (N6537)—W. A. Rollason Ltd.
G-AOHZ Auster J5P Autocrat (3252)—North Perrott Estate Co.
G-AOIN D.H.82A Tiger Moth (N6660)—H. T. Armstrong & Partners
G-AOIO D.H.82A Tiger Moth (N6907)—H. T. Armstrong & Partners
G-AOIP D.H.82A Tiger Moth (R4765)—H. T. Armstrong & Partners
G-AOIR D.H.82A Tiger Moth (R4972)—H. T. Armstrong & Partners
G-AOIS D.H.82A Tiger Moth (R5172)—H. T. Armstrong & Partners
G-AOIT D.H.82A Tiger Moth (T5465)—H. T. Armstrong & Partners
G-AOIU D.H.82A Tiger Moth (T6167)—H. T. Armstrong & Partners
G-AOIV D.H.82A Tiger Moth (T6917)—H. T. Armstrong & Partners
G-AOIW D.H.82A Tiger Moth (T6918)—H. T. Armstrong & Partners
G-AOIX D.H.82A Tiger Moth (T7087)—H. T. Armstrong & Partners

RESTORED TO REGISTER

G-ANGW Auster 5 (MS980)—Auster Aircraft Ltd.

CANCELLATIONS

(*Abbreviations: D—destroyed, SA—sold abroad, BU—broken up, WU—withdrawn from use*)

G-AEFT Aeronca C.3 (A610) (*WU*)—Not known. Temporarily unregistered
G-AEWL D.H.89A Rapide (6367)—Aviation Supplies Co. (*SA*—France)
G-AHNT Avro 652A Anson 1 (MG866)—N. D. Norman & Partner (*SA*—Eire)
G-AHPS Vickers Viking 1B (167)—B.E.A.C. (*SA as* D-ABOM)
G-AIEN Percival Proctor 5 (Ae96)—J. W. Bullen (*SA as* VH-BSH)
G-AIOC Cierva C30A Autogiro (K4239) (*WU*)—Cierva Autogiro Co.
G-AIVB Vickers Viking 1B (215)—Fair Trading Co. (*SA*—Portuguese Goa)
G-AIVD Vickers Viking 1B (217)—B.E.A.C. (*SA*—Germany)
G-AIVF Vickers Viking 1B (219)—B.E.A.C. (*SA as* D-AGIL)
G-AIVJ Vickers Viking 1B (223)—Overseas Aviation Ltd. (*SA*—Germany)
G-AIXB Taylorcraft Plus D (225)—C. G. C. Rawlins (*SA as* VP-YNM)
G-AJBM Vickers Viking 1B (239)—B.E.A.C. (*SA*—Argentine military T-92)
G-AJBS Vickers Viking 1B (244)—B.E.A.C. (*SA*—Argentine military T-93)
G-AJBY Vickers Viking 1B (250)—B.E.A.C. (*SA as* D-AFUS)
G-AJDI Vickers Viking 1B (258)—B.E.A.C. (*SA*—Argentine military T-91)
G-AKEI Miles M.6S Gemini 1A (6470) R. D. M. McCollough (*SA*—Eire)
G-AKSK D.H.104 Dove 1B (04116) (*D*)—Cambrian Air Services
G-AMNS Vickers Viking 1B (294)—B.E.A.C. (*SA*—Argentine military T-90)
G-AMPR Percival P.50 Prince 4E (P48)—Standard Motor Co. (*SA as* VR-TBN)
G-AMXU D.H.104 Dove 1B (04393)—de Havilland Aircraft Co. (*SA as* CR-AHT)
G-ANSY Avro 685 York C.1 (MW193) (*D*)—Scottish Airlines Ltd.
G-ANVK Percival Proctor 4 (NP225)—Continental Aircraft Services (*SA*—France)
G-ANVX Percival Proctor 4 (RM168) (*BU*)—Aerocontacts Ltd.
G-ANWP Percival Proctor 4 (MX451) (*BU*) Aerocontacts Ltd.
G-ANZB Percival Proctor 4 (NP292) (*WU*)—V. H. Bellamy
G-ANZH Beech A-35 Bonanza (D2108)—The Earl of Granard (*SA*—Morocco)
G-AOBT D.H.82A Tiger Moth (PG701)—D. E. Bianchi (*SA as* PH-UFO)
G-AOCD Percival Proctor 3 (LZ603)—E. Crabtree (*SA*—Belgium)

ALTERATIONS

G-ADYL D.H.89A Rapide (6311)—F. G. Fox
G-AEKV Kronfeld Drone (30) (Authorisation to fly, expires 11/6/54)—E. H. Gould
G-AGVI Auster 5 J.1 Autocrat (1860)—N. Rutter
G-AHKO Taylorcraft Plus D (LB381)—Phillips & White Ltd.
G-AHPP Vickers Viking 1B (160)—Eagle Aircraft Services
G-AHPT D.H.89A Rapide (R9550)—Don Everall Aviation Ltd.
G-AHWC D.H.82A Tiger Moth (T7456)—Britten-Norman Ltd.
G-AIBZ Auster 5 J.1 Autocrat (2161)—Don Everall Aviation Ltd.
G-AIME Bristol 170 Mk. 21 (12795)—Air Kruise (Kent) Ltd.
G-AIVC Vickers Viking 1B (216)—First Air Trading Co.
G-AJVC Miles M.38 Messenger 2A (6371)—J. J. W. Salmond
G-AJXB D.H. 89A Rapide (X7370)—Independent Air Travel Ltd.
G-AJXH Airspeed AS.65 Consul (5167)—Eagle Aircraft Services
G-AKEI Miles M.65 Gemini 1A (6470)—R. D. M. McCollough
G-AKGE Miles M.65 Gemini 1A (6488)—M. B. Rose
G-AMSA Bristol 170 Mk. 31 (13142)—Bristol Aircraft Ltd.
G-AMTO D.H.82A Tiger Moth (T6229)—J. Lewtas & Partners
G-AMUV Avro 685 York C.1 (MW226)—Dan-Air Engineering Ltd.
G-AMWB Bristol 170 Mk. 32 (13127)—Bristol Aircraft Ltd.
G-AMWC Bristol 170 Mk. 32 (13128)—Bristol Aircraft Ltd.
G-AMWD Bristol 170 Mk. 32 (13131)—Bristol Aircraft Ltd.
G-AMWE Bristol 170 Mk. 32 (13132)—Bristol Aircraft Ltd.
G-AMWF Bristol 170 Mk. 32 (13133)—Bristol Aircraft Ltd.
G-AMWU Bristol 171 (13203)—Bristol Aircraft Ltd.
G-AMYR Auster J.5G Cirrus Autocar (3052)—Not known. Temporarily unregistered
G-AMYV Douglas C-47 Dakota 3 (44-76611)—Air Kruise (Kent) Ltd.
G-ANCA Bristol 175 Britannia 300 (12917)—Bristol Aircraft Ltd.
G-ANIR Auster 5 (TJ380)—R. K. Dundas
G-ANKK D.H.82A Tiger Moth (T5854)—Mitchell Aircraft Ltd.
G-ANMF Bristol 170 Mk. 31 (13216)—Bristol Aircraft Ltd.
G-ANVR Bristol 170 Mk. 32 (13251)—Bristol Aircraft Ltd.
G-ANVS Bristol 170 Mk. 32 (13252)—Bristol Aircraft Ltd.
G-AODL Bristol 171 Mk. 4 (13403)—Not known. Temporarily unregistered.
G-AODO Westland S.55 Series 1 (WA116)—Fison-Airwork Ltd.
G-AOGT D.H.82A Tiger Moth (83594)—Aerocontacts Ltd.

AIRPORT NOTES — INTERESTING VISITORS

London Airport

8 2	G-AMUS	York C.1—Hunting-Clan Air Transport
15 2	D-IDUM	Twin Bonanza—Freiderick Kruppe
16 2	4X-ALA	Commando—EL AL
17 2	4X-AKE	Constellation—EL AL
	4X-ALC	Commando—EL AL
28 2	N90905	Skymaster—P.A.A.
2 3	G-ALDR	Hermes 4—Skyways Ltd., on charter to B.O.A.C.
4 3	ZS-DKE	DC-7B—South African Airways; delivery flight (left 6/3)
6 3	N6504c	Super Constellation—Seabord & Western Airlines

Blackbushe

27 1	T-45	Skymaster—Argentine Air Force
	T-90	Viking—ex-B.E.A. G-AMKS } Argentine Air Force; departed
	T-91	Viking—ex-B.E.A. G-AJDI } on delivery flight after mods.
	T-92	Viking—ex-B.E.A. G-AJBM } and overhauls by Eagle
	T-93	Viking—ex-B.E.A. G-AJBS } Aviation Ltd.
7/2	ZU-4	C-47 } Koninkluke Luchtmacht; from Valkenburg
	ZU-12	C-47 }
8 2	N2714B	Aero Model 560 Commander—from Prestwick; delivery by Fleetways Inc. to Indo-China; s/n. 214
17/2	YV-C-AMV	Viscount—Linea Aeropostal Venezuela; acceptance trials
29 2	G-ANMF	B170 Mk. 31—Air Charter
	G-ANBD	Britannia—B.O.A.C.; did three runs over airfield

Croydon

5 2	G-ANSH	Tiger Moth—ex-NL873; Fairoaks Aero Club
11 2	G-ALAE	Messenger—ex-RH421
14 2	VP963	Devon
15 2	G-AODR	Tiger Moth—ex-NL779; Fairoaks Aero Club
	G-AKPL	Hawk Trainer—ex-N3825 (c n. 871)
16 2	VR-LAA	Beaver
24 2	N3478V	Cessna 195
	OO-ACJ	Proctor 1
29 2	G-AHSD	Taylorcraft Plus D—ex-LB323 (c/n. 182)
4 3	G-AISF	Aerovan—(c/n. 6396)
6 3	HB-COZ	Cessna 180—Flugzeughandels A.G.

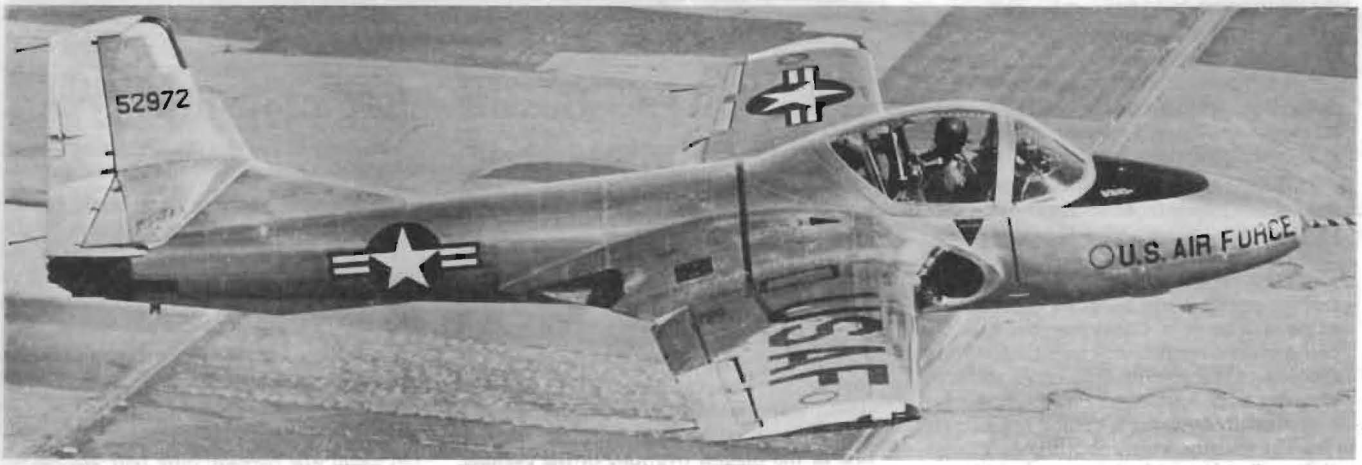
Prestwick

7/2	N2714B	Aero Commander 560—(E) Delivery flight by Fleetways Inc. to Indo-China area; first 560 to be seen in Europe
13 2	WP200	Vickers Valiant B.1—R.A.F.; made emergency landing whilst on test flight from Ministry of Supply Establishment at Defford
21 2	N68850	Curtiss C-46 Commando—(W) Ferry flight to U.S.A. by Fleetways Inc. from Calcutta, where aircraft has lain since last war. Ex-U.S.A.A.F. 477297 "Ole 97". It was originally intended to ferry via Pacific and aircraft *is* fitted with cabin tanks giving total capacity of 3,000 gals.
22/2	131898	Grumman UF-1—(E) U.S. Navy; U.S. Naval Attache to Greece
27/2	TF-ISH	Douglas Dakota—Flugfélag Islands H.F. (Iceland Airways) "Gljafaxi"
	140343	Douglas JD-1 Invader—(E) U.S. Navy; underwing tanks fitted

Northolt

2 2	315211 (BW:B)	C-47—Royal Norwegian Air Force
	XA404	Gannet AS.1; first flight
4 2	50856 (JM 856)	R5D-2Z—U.S.N.
5 2	KG455	C-47—R.C.A.F.; camouflaged
12 2	XG871	Gannet T.2; first flight
	51-8265	C-119F—U.S.A.F.; red fins
15/2	0-2503	C-54—U.S.A.F.; M.A.T.S./A.A.C.S.; red fin
22/2	XA410	Gannet AS.1; first flight
24 2	O-348792	C-47—U.S.A.F.; Soviet Air Force markings and serial 9-348792 on port side; used for film "Not for Money"

The Royal Canadian Naval Air Station (H.M.C.S. *Shearwater*) near Dartmouth, Nova Scotia, has taken delivery of thirty McDonnell F2H-3 Banshee all-weather, single-seat strike-fighters. The first R.C.N. jet fighter squadron, VF-870, is now equipped with the F2H-3s preparatory to serving in the new R.C.N. Carrier *Bonaventure* which will be completed before the end of the year. Unlike the Fleet Air Arm, which has discontinued tail markings, the R.C.N. retains red, white and blue fin flashes.



Switching from tandem to side-by-side seating, the U.S.A.F. has, with the twin-jet Cessna T-37A, the first of a new series of intermediate jet trainers. The Cessna Model 318 has a maximum speed in excess of 400 m.p.h. and an a.u.w. of 5,600 lb. The photograph shows clearly the lightweight ejection seats and the root intake to the starboard 920-lb. s.t. Continental J69-T-15 (licence-built French Turboméca Marboré II). Rubber de-icing boots on the intake are new, as are the revised aileron and flap shapes. Most noticeable changes from the prototype (U.S.A.F. 54-716) are the additional "keel" bumper and the larger fin and rudder, which are now more square-cut. The forward fin fairing is now straight-edged and of increased area. The dark (red) band immediately behind the canopy indicates the separation point for rear fuselage removal during overhauls. The T-37A is in production at Wichita, Kansas. Fifteen pre-production models are now entering service. Span 33 ft.; length 27 ft. 1 in.; initial rate of climb 3,000 ft.p.m.; range 935 miles; cruising speed 310 m.p.h. *(N.B.: Sharp eyes may detect the shadow of a swept-wing fighter which has attracted the attention of the pilot. Look for the shadow under the nose of the T-37A, almost under the "AIR" of U.S. Air Force.*

New colour schemes are being applied to U.S. Navy aircraft. Some training PBM-5 Mariners (of ATU-501, NAS Corpus Christi) are getting white top deckings, while this photograph shows the second prototype XP6M-1 Sea Master with white undersides to wings and single-step hull. Upper surfaces remain "Midnite" blue. The two men beside the hull give an idea of the size of the Martin Sea Master.

CONTRAILS

AFTER the December meeting of the Aircraft Recognition Society, one of two committee members had an extremely interesting talk with Wing Commander Roland Beamont on the subject of contrails, and the wing commander kindly summarised his views in a subsequent letter to the Society which we reproduce in full:

"Under conditions of good visibility, both from the ground and from the air, it is often possible to identify an aircraft 30,000–40,000 feet away vertically and some miles horizontally by the characteristic shape of the head of the trail. For example, a B-47 leaves four distinct trails under all trailing conditions, but when directly overhead the two centre trails can sometimes be seen to be divided, or at least indistinct, at their beginning. The latter phenomenon being caused by the two separate engines in each inboard pod. The general effect of these four main trails is that they begin as a broad arrowhead, which in fact they are owing to the wing sweep.

"In direct contrast to the B-47, the Valiant, Victor and Comet all leave a characteristically broad beginning to their contrail resulting from the closely grouped jet pipes in roughly a straight line on either side of the fuselage.

"Of the smaller fry, it is not possible to distinguish purely from the contrail between the Vampire, Venom, Sea-Hawk, Attacker and Hunter, but the trail of a Meteor can generally be distinguished as two smaller trails merging into one quite quickly. The same is true of a Canberra, but this can often be distinguished from a Meteor by the fact that the individual trails are more clearly marked out and do not join until some hundreds of yards behind the aircraft. The P.1 and the Javelin both leave characteristically dense single trails but the informed observer might be able to distinguish one from the other by performance!

"It does not seem to be possible to draw any hard and fast rules from the above observations, but I have personally on many occasions been able to confirm a contrail identification by having a closer look, and the percentage of these identifications that have turned out to be right certainly makes one feel that a similar proportion should be possible from the ground."

THE fatal accident rate for jet- and piston-engined aircraft in service with the Royal Air Force is the lowest recorded for twenty years. This was revealed by the Secretary of State for Air, Nigel Birch, in a memorandum accompanying the Air Estimates, published recently.

There has also been a decrease in the major accident rate, which is the lowest recorded for ten years.

These results have been achieved despite the increased complexity of the aircraft now in service.

Successful test firings have been made with a new version of the Martin Matador tactical missile, known as the TM-61B. For tactical missions, the TM-61B will be given an entirely new airborne guidance system.

A.T.C. Boxing Championships

THE United Kingdom finals of the A.T.C. Boxing Championships, held in the Filton canteen of Bristol Aircraft Ltd. on Saturday, 25th February, provided one of the best all-round amateur boxing shows staged in Bristol for some time.

The best performance came from 16-year-old Cadet A. McClean, of the Fort William Squadron, who scored a points victory over Cadet P. Himfen, of the Ardale Squadron, for the Sir Bertram Jones Cup. McClean boxed with all the style and assurance of a veteran and at the final gong he received one of the biggest ovations of the evening. In addition to the trophy for his weight and age, McClean also carried off the A. G. Elgin Cup for the best performance from a boy over 16 and under 18.

The *Air Reserve Gazette* Cup for the 9 st. 7 lb. contest for boys over 17 and under 18 was won by Cdt./Cpl. M. D. Kelly, of 1370 (Leven) Squadron, 66 Group, who beat Cdt. A. P. Kelly, of 305 (Ashford) Squadron, 61 Group, the fight being stopped in the third round.

Probably the hardest hitter on the bill was Garry Stuart, F/Sgt., of Boreham Wood. He had his opponent, Cdt./Cpl. Kirkwood, of Fort William, in serious difficulties before the first round was over, and quickly disposed of him in the second round.

Another impressive performance came from Raymond Scales of Enfield. Though fighting an opponent several inches taller and with a big advantage in weight, Scales landed repeatedly with solid blows throughout the fight, and was an extremely popular winner.

Six Groups were taking part—Eastern, Western and Welsh, Scottish, Southern, Northern, and Northern Ireland. There was an abundance of talent from the Eastern Group (No. 61) and they finished easy winners of the Lord Harewood Cup for the Group gaining the most points.

THE Air Ministry announces the appointment of Squadron Leader Peter Rodney Edelston, A.F.C., to command No. 601 (County of London) Squadron, Royal Auxiliary Air Force. No. 601 Squadron is located at R.A.F. North Weald, Essex. His Royal Highness the Duke of Edinburgh is Honorary Air Commodore of the squadron.

A REUNION for all ranks who served in the R.A.F. in Aden and outstations, Nos. 8 and 621 Squadrons, etc., during 1939–45 will be held at the Chatham Rooms Restaurant, Victoria Station, London, S.W.1, on 14th April. Details from W. Brackenbury, 98 Meopham Road, Mitcham, Surrey.

THERE was a record attendance of over 150 people at the Aviation Film Show held by The London Society of Air-Britain in March. Because of a rapid increase in membership, larger accommodation will be provided on future occasions. In addition, further aviation film shows will be featured and a schedule of some thirty-seven films has already been arranged.

At the next meeting, to be held on Wednesday, 4th April, at Caxton Hall, S.W.1, at 7 p.m., presentation will be made to the Individual Aircraft Recognition Champion of Air-Britain of the new British Overseas Airways Corporation "Speedbird" Trophy, for which competitions are held regularly.

Letters to the Editor

ALAN MARSH FUND

THE name of Alan Marsh will be familiar to many of your readers, both as a professional pilot of the highest skill and integrity, and as an Instructor of forceful persuasion and infinite patience. When he died in 1951, whilst flying an experimental helicopter, a life dedicated to aviation and particularly that of rotary-wings, came to an untimely end. But his memory lives on, and those who worked and played with him intend that it shall be perpetuated in a worthy manner.

That is the reason for the existence of the Alan Marsh Memorial Trust Fund, the main object of which is to provide each year, from income, sufficient financial support to enable a young engineer with a technical background in the rotary-wing field, to acquire first-hand experience, at a recognised training establishment, of the problems associated with helicopter pilotage.

But the cost of such flying is high, and whilst with but little effort on our part, donations to the Fund already amount to £1,300, this capital sum needs to be at least doubled to produce the necessary annual income.

A medal is also being awarded each year for outstanding pilotage achievement, and the cost of producing these medals is high.

May I, therefore, on behalf of this good cause, ask that your Journal will make our objective known to that wider circle of Alan's friends now scattered far and wide, and with whom contact by any other means is impracticable.

Will those who feel our objective is worthy of their practical support, please send their contributions to the Honorary Secretary, the Helicopter Association of Great Britain, 4 The Sanctuary, Westminster, London, S.W.1.—**R. A. C. Brie, Chairman of the Trustees, Vice-President, The Helicopter Association of Great Britain.**

PUZZLING TIGER

ROVING Spotter, in the January issue of *Air Pictorial*, was in error when he identified the American "Moth" as a Moth Major. This aircraft is, in fact, a D.H.82A Tiger Moth. So far as I know no Moth Majors were exported to the U.S.A.; only Moths of earlier models—and many of these were built in the U.S.A. by the Moth Aircraft Corp.

Actually the Tiger Moth depicted in the photograph is rather interesting in view of the change in registration marking to suit the film "Spirit of St. Louis". The digit 2 was taken out and replaced by a C, since before 1949 all U.S. registered planes showed NC rather than N, so that an N registered plane would have been rather out of place in a film supposed to have taken place in the late "twenties".

This photograph shows the Tiger Moth By J. M. G. Gradidge before the registration was altered..

Behind the Tiger Moth is visible the tail of another D.H. type. This is a D.H.60G Moth with the marking NC1510V, also owned by Paul Mantz, who had a great deal to do with the making of the Lindbergh film.

It would be interesting to learn where these two aircraft came from, since the Tiger Moth is not a Canadian-built version (lacking the D.H.82C's canopy). The Moth was probably registered since 1948, judging by the date of registration of other aircraft in the same range of numbers. The Tiger Moth is a recently registered aircraft, and quite possibly came from England.—**J. M. G. Gradidge, 32 Meadow Way, Rickmansworth, Herts.**

Ju 88 REMAINS

ON reading the second instalment of the Ju 88 Story I was reminded of the time I was guarding an abandoned *Luftwaffe* depot. Amongst the mass of components and planes was a number of gun packs similar to those shown on page 44 of the February issue of *Air Pictorial*.

There were thirty packs of two separate types mounting three types of guns. Some containers had the six 7.9-mm. MG 81, while others were fitted with two Oerlikon FF guns.

These gun packs were very compact but were liable to give trouble owing to the complicated feeding slides, which carried the ammunition from the back of the packs.

The guns were installed with a 10 to 15-degree downward tilt, and were inclined to fire at the ground when the Ju 88s were in level flight.

Among the many interesting components were some Dewoitine D.520 wings with light-blue upper surfaces; yellow undersurfaces and in German Air Force markings. —**At. J. Cuny, 30 Escath d, Chasse d, Mut, BA, Tours.**

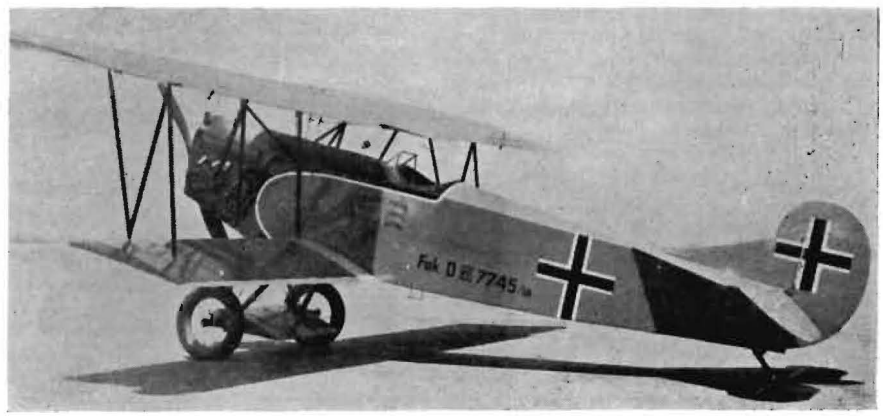
PATEE CROSSES

THE old teaser, the Fokker D.VIIs carrying patee crosses, has puzzled another reader and probably several others as well as Mr. Geary. I have heard that a few D.VIIs actually did get the old cross, but have yet to be given any definite confirmation of this.

The photographs mentioned by Mr. Geary, are almost certainly "stills" from one of the films produced in America in pre-1939 days. These photographs can be seen in considerable numbers in many of the old magazines, and the explanation given is that the curved cross gave a much better representation on film than did the correct Latin cross. All the genuine Fokkers and Travelaire "converts" used in "Hell's Angels" had patee crosses. An interesting point concerning these mock Fokkers is that the owners were offered a complete overhaul and

(*Continued overleaf*)

The Paul Mantz Fokker D VII with correct German markings.



LETTERS (*Continued*)

change of decor, when the film was finished, but to a man, they flew the aircraft away still in movie "warpaint".

To the best of my knowledge, all the existing Fokker D.VIIs have the correct straight cross, including that belonging to

The patee crosses are clearly marked on this faked German machine, used in many Hollywood World War I Films including "Hell's Angels".

Paul Mantz, and it looks perfectly all right on film.

Should any reader have proof that the patee cross was used on this type in the actual war days, I would be very pleased to hear from him.—**Frank Yeoman, 31 Oban Avenue, West Hartlepool, Co. Durham.**

EXPORT VIKINGS

I WAS most interested to see the excellent letter which Mr. C. Peter Smith wrote to you and which was published in your February issue.

It may be of interest to readers to learn that Viking G-AHPP, Viking G-AIVB have now been sold to the new airline in Goa, Portuguese India, known as Transportes Aereos Da India Portugueza. The new registrations will be CR-IAC (G-AHPP) and CR-IAD (G-AIVB).

G-AJBP has now been completely overhauled by us and is forming part of the Eagle Aviation Viking fleet.

Viking G-AMNR has now left the Eagle Aviation fleet and sold to Independent Air Travel Limited. Viking G-AIVJ which your reader noted had Overseas Aviation painted on the side, has now changed its colours again and has gone to Lufttrensportunion, Frankfurt, to join its sister ship G-AIVI.

The four Vikings, T.90, T.91, T.92 and T.93, for the Argentine Government have left Blackbushe Airport on their long journey to Buenos Aires.—**P. C. F. Morgan (Managing Director), Eagle Aircraft Services Ltd., Blackbushe, Surrey.**

CHEQUERED HISTORY?

IT gave me quite a thrill to see a genuine air-to-air photograph of the old-timer Thomas-Morse S-4C taken by Harold G. Martin (*Air Pictorial*, March 1956). Perhaps some British old-timers still flying could be similarly treated?

Delving back into history is a fascinating, though not necessarily profitable, pastime. Nevertheless I have two queries which the experts amongst *Air Pictorial* readers might care to answer.

First, what is the origin of the checkerboard markings which have brightened up so many aircraft finishes since the First World War? The Thomas-Morse S-4C which I have already mentioned has them in black and yellow on the Le Rhône cowling. And, in the February issue of *Air Pictorial* we have the recently resuscitated Winter Zaunkonig (Wren) which is powered by a 51-h.p. Zundapp Z9-92 (G-ALUA, ex-VX190). The Zaunkonig has blue and white checkerboard markings.

Secondly, in trying to get together a small library, and with only limited time and money at my disposal, I wish to possess about a dozen books on the First and Second World Wars. The books I require are those in the personal narrative style, by pilots or other aircrew, the main thing being that I want the books to reveal genuine expression of the period and the nationality. I am looking for books printed in English by Englishmen, Germans, Americans, Russians, Italians and Frenchmen.—**L. Whitfield, Newcastle upon Tyne, Northumberland.**

CAN YOU TELL ME . . .?

HISTORY and post-war activity of Anthony Fokker after World War I?—**D. M., West Ryde, N.S.W., Australia.**

(*Best history of Anthony Fokker is contained in his autobiography* Flying Dutchman (*published by G. Routledge, Cartel Lane, London, E.C.*4). *Born* 1890 *in Java, Anthony H. G. Fokker was a designer of inspired genius whose Fokker fighters created the popular phrase "the Fokker Scourge" in the First World War. With the collapse of Germany in* 1918, *Fokker set to and smuggled no fewer than* 120 *D.VIIs and the prototype F.II cabin five-seater into Holland under the very noses of the Armistice Commissioners. The F.II cantilever monoplane was the forerunner of many other famous Fokker types which were purchased throughout the world. Anthony Fokker died in* 1939 *in America.*)

INFORMATION on the German, World War II, Kalkart Ka 430 transport glider?—**J. S., Midhurst, Sussex.**

(*A rear-entry, high-wing, nosewheel undercarriage freight transporter, the Kalkart Ka* 430 *was never put into service although a dozen were delivered out of the original order for thirty. The cargo hold measured* 12 *ft. x* 5 *ft.* 10 *in. x* 4 *ft.* 2 *in. and armour plating was provided forward of pilot's feet. A dorsal turret mounted a single* 13-*mm. MG*131 *machine gun. Construction was of steel tube with light plywood/fabric covering. Span* 63 *ft.* 9 *in. length* 46 *ft.* 6 *in.; height* 14 *ft.* 7½ *in.; mainwheel track* 7 *ft.* 3½ *in.; max. cargo load* 3,080 *lb. Towing aircraft: Heinkel He* 111 *and Junkers Ju* 88.)

PHOTO REVIEW "FIND"

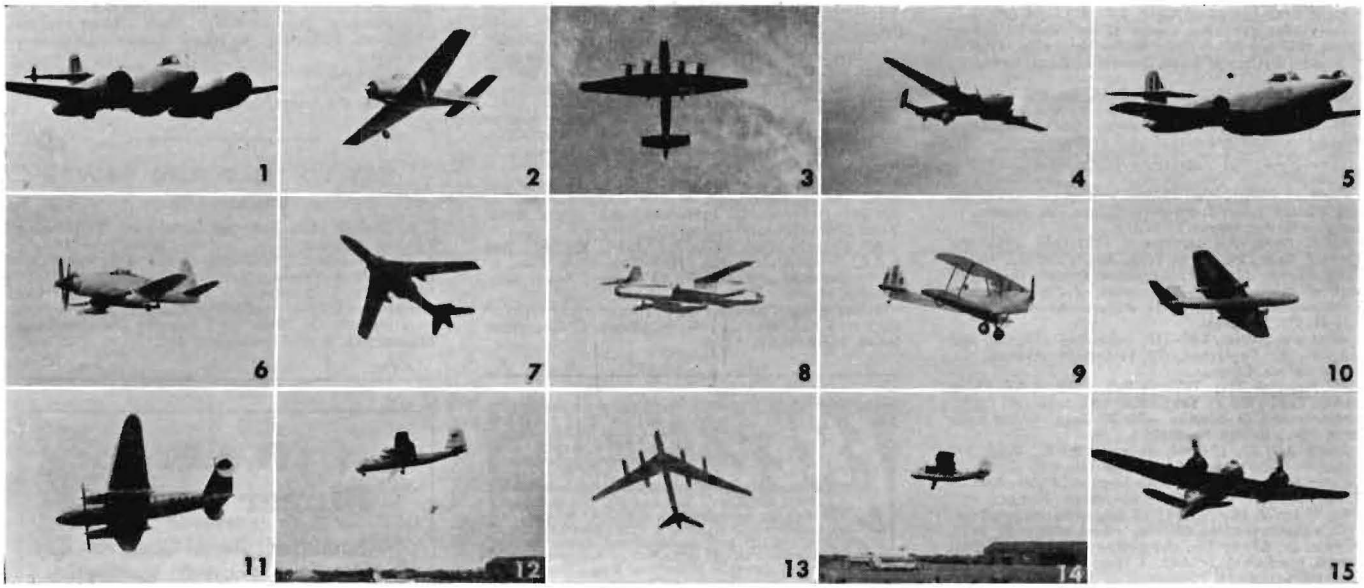
BUILT at Lindbergh Field, San Diego, Calif., the 30-passenger Convair Model 110 (NX90653) was first test-flown in the summer of 1946. The following year, on 16th March, the prototype 40-passenger Model 240 Convair-Liner (NX24501) took to the air at Lindbergh Field. From then on, the Model 110 was successfully spirited away. The prototype Model 240 had a new lease of life by becoming the flying test-bed for the 2,925-e.s.h.p. Allison Model 501s (YT38s—predecessors of the YT56-A-3s which power two M.A.T.S. Convair YC-131C Samaritans). Renamed the Turbo-Liner, N24501 flew at San Diego on 29th December, 1950, to become the first U.S. turboprop transport aircraft, cruising at 310 m.p.h. with an a.u.w. of 41,790 lb.

The Model 110 differed from the later Model 240 in a variety of ways. Strangely enough, the fuselage was fatter though the accommodation was ten fewer. The seven main windows were porthole type and the passenger entrance was built in under the rear fuselage, like the Martin 2-0-2. Most noticeable external difference, however, was in the shape of the motor nacelles. In the Model 110 large oil-cooler intakes were fitted, giving the same ungainly effect that is to be found with another American transport today—the Boeing YC-97J. The radials were two 2,100-h.p. Pratt & Whitney Double Wasp R-2800s driving 4-blade, 12 ft. 2 in. diameter, Hamilton Standard metal airscrews.

Comparative figures:

	Model 110	*Model* 240
Span	89 ft. 0 in.	91 ft. 9 in.
Length	71 ft. 0 in.	74 ft. 8 in.
Loaded weight	35,970 lb.	41,790 lb.
Speeds—Max.	330 m.p.h.	347 m.p.h.
Cruising	270 m.p.h.	270 m.p.h.
Range	560 miles	1,800 miles

"Old and New" (*Answers on page 144*)



BRITISH REGISTRATIONS IDENTIFIED

by F. A. Hudson, British Civil register specialist of Registration Research

G-EAAA D.H.9 (ex-C6054); cancelled 1/9/19

G-ACBH Blackburn B.2 (c n. 4700/3); cancelled 14/7/42, fuselage in breakers' yard near Downham, Essex

G-AFVF Cub J/4 (c/n. 4/586); impressed 1941 as BV991, restored 1946 and written off 1950

G-AGPD Marathon 1 (c/n. 6265); M.o.S.; crashed near Amesbury, Wilts, 28/5/48

G-AGPW Brabazon 1 (c/n. 12759); M.o.S.; carried serial VX206 for a short period, dismantled at Filton

G-AGUB Hermes 2 (c/n. 1); M.o.S.; now carries serial VX234

G-AHJC Freighter 21E (c n. 12735); Australian National Airways; now VH-INK

G-AHYZ Sandringham 5 (ex-ML784); Short Bros. & Harland Ltd.; burnt out at Belfast 2/2/47

G-AHZD Sandringham 5 (ex-NJ257); B.O.A.C.; sold to Q.A.N.T.A.S. as VH-EBV

G-AIFO Freighter 21E (c/n. 12775); sold to C.A.A.C. as VP-YHZ, then to W.A.A.C. as VR-NAA

G-AIKM Avro 19 (c/n. 1364); B.S.A.A.C.; crashed near Luton 21/4/49

G-AJBM Viking 1B (c/n. 239); ex-B.E.A. "Sir Charles Knowles"; sold to Argentine Air Force as T-92

G-AJBS Viking 1B (c/n. 244); ex-B.E.A. "Sir Cloudesley Shovel"; sold to Argentine Air Force as T-93

G-AJBZ Viking 1B (c/n. 251); delivered to Air India as VT-CRB

G-AJCB Viking 1B (c/n. 253); delivered to Air India as VT-CRC

G-AJDI Viking 1B (c/n. 258); ex-B.E.A. "Sir Christopher Craddock"; sold to Argentine Air Force as T-91

G-AJGT Dove 5X (c/n. 04034); D.H. Engine Co. Ltd.; currently registered

G-AJTD Aerovan 4 (c/n. 6415); crashed at Newtownwards 3/11/48

G-AJZA Proctor 4 (ex-NP395); broken up 1948

G-AKBW Dragon Rapide (ex-X7443); broken up 1948

G-AKYH Sea Otter (ex-G-AJVR, ex-JM966); sold abroad 1949

G-AMNS Viking 1B (c/n. 294); ex-B.E.A. "Sir Dudley Pound", ex-South African Airways ZS-BNI); sold to Argentine Air Force as T-90

We regret that we have been obliged to go to press without FOREIGN REGISTRATIONS owing to circumstances outside our control having rendered it necessary to advance our usual press date.

INFORMATION WANTED

American and British aircraft operating from airfields Northants, Huntingdonshire, Lincs and Beds during the last war.—J. M. Smith, 4 New Road, Pytchley, Nr. Kettering, Northants.

Details of cockpit, gun mountings and external fittings of the Mitsubishi G4 M1 Betty I-1, also photos of this aircraft wanted.—J. J. Rickards, 95 Sir Henry Parkes Road, Canley, Coventry, War.

Serial numbers of Westland Whirlwind H.A.R.2 helicopters of No. 22 Squadron, Coastal Command, Martlesham Heath (A.S.R.).—J. R. F. Creamer, 34 Woodberry Way, Walton-on-Naze, Essex.

Plans, photos, cuttings, drawings and any information on post-war Soviet and Soviet satellite aircraft. Experimental "one-off" and variants especially appreciated.—3508393 Cpl. Fraser, R.A.F. Dumfries, Scotland.

Details of control panel of Sopwith Tabloid Scout, also colour scheme, lettering on tail of Tabloid Serial No. 394.—J. A. Withers, Fairway, Coventry Road, Bickerhill, Solihull, War.

Identification, serials, construction numbers and fate of British aircraft from G-AAAA to G-AFZZ.—R. J. Bennison, 9 Kingsbury Road, Dalston, London, N.1.

Data, photos and three-view of the F. Taylor A.101 and B.102 aircraft.—F. G. Baker, 641 Gales Street, Dagenham, Essex.

All civil registrations, details and cuttings of Short flying boats from the Empire "C" class to the Solent. Also cuttings and information on the Saro Shrimp and Lerwick.—M. Ford, 20 Chandos Road, Newbury, Berks.

WANTS, DISPOSALS AND EXCHANGES

Wants

Colour scheme of ME 109G, preferably one which was in action against U.K.—C. T. Bishop, 2 Norse Avenue, Staningfield, Bury St. Edmunds, Suffolk.

Observer's Book of Aircraft, 1945, will pay up to 3s.—R. Kent, 83 Poplar Road, Merton Park, S.W.19.

Air Pictorial for Jan. 1954, must be in good condition. Please state price.—W. A. Franklin, 92 Footscray Lane, Sidcup, Kent.

Air Pictorial, Oct. 1953.—P. H. T. Green, 13 Devonshire Ave., Grimsby, Lincs.

Pre-World War II copies of *Jane's A.W.A.*, *Aerophile* magazine and pre-war Dinkie toys.—R. Straub, Box 675A, Route 1, Amelia, Ohio, U.S.A.

Photographs and negs. of Commandos, Catalinas, Lightnings, Mitchells, Walrus and Spitfire aircraft.—A. H. Porteous, 2 Orwell Place, Haymarket, Edinburgh, Scotland.

Loan of negs. or photos of Autocrats 'JAS, 'JUD, Chilton 'FSV Sparrowjet at Yeadon race meetings, 1955. Cash or exchange similar.—G. A. Cull, 71 Valley Way, Stevenage, Herts.

Wanted urgently, registrations of Aer Lingus Viscount and Bristol 170 at London Airport on 8/7/55, and serials and details of previous and subsequent history of aircraft used at any time by the Irish Air Corps.—L. Grainger, 70 St. Paul's Road, Chichester, Sussex.

Correspondents in America and Canada. Can offer copies of *Air Pictorial* and *Aeroplane* in exchange.—H. J. Heath, 11 Edwards Crescent, Wareham, Dorset.

Urgent: *Jane's A.W.A.* of any year, preferably 1914–18 period. State price.—R. Hall, 47 Arthur Street, Gravesend, Kent.

H.M.S.O. Handbooks of the Hawker Demon, Hart, Audax and the Bristol Bulldog Mk. IIA, also any other material covering these aircraft.—I. O. Newton, 164 Broadwater Crescent, Marymead, Stevenage, Herts.

Photos, silhouettes, scale plans and information of any World War I and pre-1940 aircraft.—R. Henley, 70 Hayes Hill, Hayes, Bromley, Kent.

Exchanges

Captain Albert Ball, V.C., for *Aircraft of the Fighting Powers*, Vol. I, 1940, in good condition.—A. Lester, Marine House, Freshwater Bay, I.O.W.

Small number of recognition models to exchange for similar, Skybird or Penguin models.—P. Farrar, 107 Barton Road, Torquay.

Correspondent wanted in Japan (English speaking) to exchange negs. and information.—A. H. Porteous, 2 Orwell Place, Haymarket, Edinburgh, Scotland.

German wartime books, *Fliegen und Siegen*, book with eighty stereoscopic photos about the former Luftwaffe, *Fliegende Front*, *Flieger*, *Funker* and *Kanoniere*. Will exchange for complete set of *Aircraft of the Fighting Powers* or for *Jane's A.W.A.*, 1939–47.—J. van Weerden, Meerbeiplein 85, The Hague, The Netherlands.

(*Continued overleaf*)

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WANTS, DISPOSALS, ETC.

(Continued from previous page)

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Jane's A.W.A., 1942 and 1943–44, for the books of Miles, Bristol and Westland aircraft, and Spitfire.—J. D. Owen, 9 Lane End, Bramley, Nr. Basingstoke, Hants.

Disposals

Flight and *Aeroplane*, thirty-three copies, 1948–56, plus ninety aircraft cuttings. Offers.—B. James, 13 Hermon Grove, Hayes, Middx.

R.A.F. Flying Review, March 1953–Feb. 1956, *Air Pictorial*, Sept. 1951–Feb. 1956, *Aircraft of the World*, *Flying Planes*, *Aircraft Recognition Annual*, *Observer's Book of Aircraft*, 1954–55, copies of *Flight* and the *Aeroplane*.—E. J. Petty, 11 Moore Avenue, South Shields, Co. Durham.

Aeroplane Spotter, 168–216, excluding 174, 205 and 212.—K. E. Townsend, 21 Holmfield Avenue, St. Annes-on-Sea, Lancs.

Air Pictorial, May 1953 to Feb. 1956, *R.A.F. Flying Review*, Feb. 1953 to Feb. 1956, and copies of *Flight*, *Aeroplane* and *Aeronautics*.—D. Z. Ragg, Wood Lane Farm, Malin Bridge, Sheffield 6.

Jane's A.W.A., 1945/46, as new, *A.F.P.*, Vols. 1–7 inclusive, *Gibb's A/C Recognition Manual*, *R.A.F. in Pictures*, *Britain's Wonderful Air Force* and *Fighter Pilot*.—C. Nash, 29 Legrace Avenue, Hounslow, Middx.

Air Pictorial, March 1952 to Jan. 1956 except Sept. 1952, a guinea secures. *Observer's Book of Aircraft*, 1952, as new, 2s. 6d. or 23s. the two. *Aircraft Radio*, 1943, superb condition, 3s.—D. J. Rudd, 42 Braithwaite Gardens, Stanmore, Middx.

One hundred and thirty-three *Recognition Journals*, four volumes *Flight* (two bound).—L. G. Cooper, 12 Rylston Avenue, Keresley, Coventry.

Sell or exchange *Double Decker* C666 and *German War Birds*. Wanted, *Der Soldatenfreund Auggabe C. der Luftwaffe*, any year.—E. J. Read, 52 Cardiff Road, Norwich, Norfolk.

For sale, *Air Pictorial*, Nov. 1952–Dec. 1955, also odd *Flights* and the *Aeroplane*, including Coronation *Flight* and *Fifty Years of Powered Flight*.—J. R. Booth, 181 Brookhill Street, Stapleford, Notts.

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Aircraft Recognition Manual by C. H. Gibbs-Smith, 1952, *The Sky's the Limit*, or will change for copy of *Winged Warfare*.—L. Lofthouse, 263 Hydes Road, West Bromwich, Staffs.

Air Pictorial, Jan. 1953–Dec. 1954, 12s. 6d., and *R.A.F. Flying Review*, Jan. 1954–Dec. 1955, 10s., or £1 1s. for both.—R. J. Hills, 5 Queens Road, Winchester, Hants.

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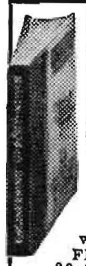

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